155-504

TRANSCRIPT OF RECORD.

SUPREME COURT OF THE UNITED STATES.

OCTOBER TERM, 1893.

No. ~~304~~. 94

C. & A. POTTS & CO., APPELLANT,

vs.

FRANK F. CREAGER, HARRY M. CREAGER, AND JONATHAN CREAGER.

APPEAL FROM THE CIRCUIT COURT OF THE UNITED STATES FOR THE SOUTHERN DISTRICT OF OHIO.

FILED FEBRUARY 27, 1891.

(14,498.)

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SUPREME COURT OF THE UNITED STATES.

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vs.

FRANK F. CREAGER, HARRY M. CREAGER, AND JONATHAN CREAGER.

APPEAL FROM THE CIRCUIT COURT OF THE UNITED STATES FOR THE SOUTHERN DISTRICT OF OHIO.

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JUDD & DETWEILER, PRINTERS, WASHINGTON, D. C., FEBRUARY 10, 1894.

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1 THE UNITED STATES OF AMERICA, } ss:
Southern District of Ohio, Western Division, }

At a stated term of the circuit court of the United States of America, within and for the western division of the southern district of Ohio, in the sixth judicial circuit of the United States of America, begun and had in the court-rooms at the city of Cincinnati, O., in said district, on the first Tuesday of October, being also the seventh day of that month, in the year of our Lord one thousand eight hundred and ninety, and of the Independence of the United States of America the one hundred and fifteenth—present, the Honorable George R. Sage, district judge—among the proceedings had were the following, to wit:

C. AND A. POTTS & CO., Complainant,
vs.
FRANK F. CREAGER, HARRY M. CREAGER, and JONATHAN CREAGER, Defendants. } In Equity.

Be it remembered that heretofore, to wit, on the 29th day of May, in the year of our Lord one thousand eight hundred and eighty-nine, came the complainants, by their solicitors, and filed in the clerk's office of said court their certain bill of complaint against the defendants herein. Said bill of complaint is clothed in the words and figures following, to wit:

Bill of Complaint.

2 In the United States Circuit Court for the Southern District of Ohio, W. D.

C. AND A. POTTS & CO., Complainant,
vs.
FRANK F. CREAGER, HARRY M. CREAGER, and JONATHAN CREAGER, Defendants. } In Equity.

To the judges of the circuit court of the United States for the southern district of Ohio, in equity:

C. and A. Potts and Co., a corporation duly created, organized and doing business under the laws of the State of Indiana, and having its principal place of business at the city of Indianapolis, in said State, brings this bill into this court against Frank F. Creager and Harry M. Creager, doing business under the firm name of Jonathan Creager's Sons, and Jonathan Creager, the manager of the business of said firm, and supposed to be interested therein, said firm having its principal place of business at the city of Cincinnati, Ohio, where also defendants reside.

3 And thereupon your orator complains and says that on and before the 14th day of July, 1885, Clayton Potts and Albert Potts were citizens of the United States, and were the true,

original, first and joint inventors of certain new and useful improvements in clay disintegrators, fully described in the specifications of letters patent hereinafter mentioned, and which was not known or used in this country and not patented or described in any printed publication in this or any foreign country before their invention thereof, and was not in public use or on sale more than two years prior to their application for letters patent therefor, for which invention letters patent of the United States No. 322,393 were issued to said Clayton Potts and Albert Potts on the 14th day of July, 1885, as hereinafter mentioned.

And your orator further shows unto your honors that the said Clayton Potts and Albert Potts, so being the joint inventors of the said improvements, and being citizens of the United States, made application to the Commissioner of Patents for letters patent for said invention, in accordance with the laws of Congress in such cases made and provided, and letters patent for said invention in due form of law were, upon the application of said Clayton Potts and Albert Potts, issued and delivered to said Clayton Potts and Albert Potts in the name of the United States of America, and under seal of the United States Patent Office, and were signed by the acting Secretary of the Interior of the United States and the Commissioner of Patents of the United States, whereby the said letters patent did grant to the said Clayton Potts and Albert
4 Potts, their heirs or assigns, for the term of seventeen years from the 14th day of July, 1885, the exclusive right and title to make, vend and use throughout the United States and territories thereof the said invention described and claimed in said letters patent, as by reference to said letters patent or a certified copy thereof here in court to be produced will more fully and at large appear.

And your orator further shows unto your honors that thereafter, since the 14th day of July, 1885, the said Clayton Potts and Albert Potts by an instrument in writing, duly executed under their hands and seals, and bearing date the 4th day of March, 1886, which instrument was duly recorded in the Patent Office of the United States, for a good and valuable consideration, sold, assigned and set over to the said C. and A. Potts and Co., their assigns, successors and legal representatives, all their right, title and interest in and to the said invention as secured to them by said letters patent, and in and to said letters patent, as by said assignment or certified copy thereof here in court to be produced will more fully and at large appear.

And your orator further shows unto your honors that on or before the 23d day of August, 1887, Clayton Potts and Albert Potts were citizens of the United States, and were the true, original and firs- and joint inventors of certain new and useful improvement in clay disintegrators, fully described in the specification of letters patent hereinafter mentioned, and which was not known or used in this country, and not patented or described in any printed publication in this or any foreign country before their invention
5 thereof, and was not in public use or on sale more than two years prior to their application for letters patent therefor for

which invention letters patent of the United States No. 368,898 were issued to said Clayton Potts and Albert Potts on the 23d day of August, 1887, as hereinafter mentioned.

And your orator further shows to your honors that the said Clayton Potts and Albert Potts so being the joint inventors of the said improvements, and being citizens of the United Stases, made application to the Commissioner of Patents for letters patent for said invention in accordance with the laws of Congress in such cases made and provided, and letters patent for said invention in due form of law were upon the application of said Clayton Potts and Albert Potts issued and delivered to said Clayton Potts and Albert Potts in the name of the United States of America, and under seal of the United States Patent Office, and were signed by the Acting Secretary of the Interior of the United States and the Commissioner of Patents of the United States, whereby the said letters patent did grant to the said Clayton Potts and Albert Potts, their heirs or assigns for the term of seventeen years from the 23d day of August, 1887, the exclusive right and title to make, use and vend throughout the United States and Territories thereof, the said invention described and claimed in said letters patent as by reference to said letters patent, or a certified copy thereof, here in court to be produced will more fully and at large appear.

6 And your orator further shows unto your honors that thereafter since the 23d day of August, 1887, the said Clayton Potts and Albert Potts by an instrument in writing duly executed under their hands and seals, and bearing date the 25th day of May, 1889, which instrument was duly recorded in the Patent Office of the United States, for a good and valuable consideration, sold, assigned and set over to the said C. and A. Potts and Co., their assigns, successors and legal representatives, all their right, title and interest in and to the said invention as secured to them by said letters patent and all choses in action arising under or growing out of said letters patent as by said assignment or certified copy thereof here in court to be produced will more fully and at large appear.

And your orator further shows unto your honors that on and before the 12th day of June, 1888, George Potts was a citizen of the United States and was the true, original and first inventor of certain new and useful improvements in clay disintegrators, fully described in the specification of letters patent hereinafter mentioned and which was not known or used in this country and not patented or described in any printed publication in this or any foreign country before his invention thereof and was not in public use or on sale more than two years prior to his application for letters patent therefor for which invention letters patent of the United States No. 384,276 were issued to said George Potts on the 12th day of June, 1888, as hereinafter mentioned.

And your orator further shows unto your honors that the said George Potts, so being the inventor of the said improvements, and being a citizen of the United States, made application to the

7 Commissioner of Patents for letters patent for said invention in accordance with the laws of Congress in such cases made

and provided, and letters patent for said invention in due form of law were, upon the application of said George Potts, issued and delivered to said George Potts in the name of the United States of America and under seal of the United States Patent Office, and were signed by the acting Secretary of the Interior of the United States and the Commissioner of Patents of the United States, whereby the said letters patent did grant to the said George Potts, his heirs or assigns, for the term of seventeen years from the 12th day of June, 1888, the exclusive right and title to make, vend and use throughout the United States and Territories thereof the said invention described and claimed in said letters patent, as by reference to said letters patent or a certified copy thereof here in court to be produced, will more fully and at large appear.

And your orator further shows unto your honors that thereafter, since the 12th day of June, 1888, the said George Potts, by an instrument in writing duly executed under his hand and seal and bearing date the 31st day of May, 1889, which instrument was duly recorded in the Patent Office of the United States, for a good and valuable consideration sold, assigned and set over to the said C. and A. Potts and Co., its assigns, successors and legal representatives, all his right, title and interest in and to the said invention, as secured to him by said letters patents, and in and to said letters patent, and all choses in action arising from or growing out of said letters patent, and by said assignment, or certified copy thereof, here in court to be produced, will more fully and at large appear.

8 By said assignments all the right, title and interest in and to said letters patent of the United States numbers 322,393, 368,898 and 384,278 are vested in your orator, C. and A. Potts and Co., since the dates of said assignments, as before alleged, and all rights and choses in action under said letters patent numbers 368,898 and 384,278 for prior use and infringement thereof are also vested in your orator by said assignments.

And your orator further shows unto your honors, on information and belief, that since the said assignments to your orators of said letters patent numbers 322,393 and during the equitable ownership of said letters patent numbers 368,898 and 384,278, by your orator and up to the time of commencement of this action, without the consent, license or allowance of your orator, and against its will, said defendants have unlawfully and wrongfully infringed and injured the rights of your orator in vending within the city of Cincinnati and State of Ohio, and elsewhere, clay disintegrators constructed according to the said letters patent numbers 322,393, 368,898 and 384,278, and embodying and using the material and substantial parts of said inventions as described and claimed in said letters patent granted to Clayton Potts and Albert Potts, and George Potts, as aforesaid, to the damage and injury of your orator, and to the profit and advantage of the said defendants, and have refused to desist from such unlawful doings as aforesaid, or pay over to your orator any of the profits or advantages which defendants have derived therefrom, and which your orator is entitled to, which acts

and doings are contrary to equity and good conscience, and result to the injury of your orator.

9 And your orator further shows unto your honors, on information and belief, that the said defendants well knowing all the facts set forth are now using and vending clay disintegrators substantially the same in construction and essentially the same in arrangement and operation as described and claimed in the aforesaid letters patent, the sole and exclusive right and privilege to sell which is vested in your orator, but how many such clay disintegrators the defendants have sold your orators is ignorant of and cannot set forth, but avers on information and belief that the defendants have sold a large number thereof, and that the defendants have derived large profits therefrom, but to what amount your orator is ignorant of and cannot set forth, and that your orator has been deprived of considerable profits and incurred large damages arising from the said infringement and they have reason to fear, and do fear, that unless the said defendants are restrained by writ of injunction issued by this court, that the defendants will continue to infringe upon the rights of your orator by vending or causing to be sold said clay disintegrators without lawful right, thereby causing great injury to your orator.

To the end, therefore, that the defendants may, if they can show reason why your orator should not have the relief hereby praved, and may upon their several and respective corporal oaths and according to the best and *and* utmost of their knowledge, remembrance, information and belief, full, true, direct and perfect answer make to the matters hereinbefore stated and charged, and that the said defendants may answer the premises, and that

10 they may be decreed to account for and pay over the income or profit thus unlawfully derived or which might have been derived from the violation of the rights of your orator as above stated, and be restrained from any further violation of said rights, your orator prays that your honors may grant a writ of injunction issuing from and under the seal of this honorable court perpetually enjoining and restraining the said defendants, their clerks, attorneys, servants, agents and workmen from any further sale or use in any manner of said patented improvements, or any part thereof, in violation of the rights of your orator as aforesaid, and your orator further prays that a provisional or preliminary injunction be issued restraining the said defendants from any further infringement of said letters patent pending this cause.

And your orators further prays that the defendants, by a decree of this court, may be compelled to account for and pay over to your orators all the profits which defendants have derived or shall have derived from any selling or using any specimen of improvements covered by the said letters patent; and also that defendants be decreed to pay all damages which your orator has incurred or shall have incurred on account of defendants' infringement of said letters patent, and that your orator may have such further relief as the equity of the case or the statutes of the United States may require or to the court seem just.

May it please your honors to grant unto your orator not only a writ of injunction conformable to the prayer of this bill, but
11 also a writ of subpœna of the United States of America, issuing out of and under the seal of this honorable court directed to the said defendants, Frank F. Creager, Henry M. Creager and Jonathan Creager, commanding them on a day certain, thereon to be named, and under a certain penalty, to be and appear in this honorable court then and there to answer all and singular the premises, and to stand and abide such further order, direction and decree as may be made against them. And your orator will ever pray.

C. & E. W. BRADFORD,
Solicitors and of Counsel for Complainants.

12 THE UNITED STATES OF AMERICA, }
State of Indiana, Marion County, } ss:

Before me, the subscriber, duly authorized to administer oaths, personally appeared Clayton Potts, who being duly sworn, deposes and says that he is the secretary and treasurer of The C. and A. Potts and Co., the complainant in this bill, that so far as the statements herein contained are within his own knowledge they are true, and so far as they are derived from the information of others he verily believes them true, and he further says that he verily believes that the said Clayton Potts, Albert Potts and George Potts, named in said bill to be original, true and first inventors of the new and useful improvements described in the letters patent granted to them, mentioned in the foregoing bill, and that the title to said letters patent is now justly and exclusively vested in the complainant as stated in said bill.

CLAYTON POTTS.

Subscribed and sworn to before me at Indianapolis, Indiana, this 27th day of May, 1889.

B. F. WITT,
Notary Public in and for Marion County, Ind.

13 And afterwards, to wit, on the 29th day of May, A. D. 1889, there was issued out of the clerk's office of said court our certain subpœna in chancery, directed to the marshal of the district and against the defendants herein. Said subpœna is clothed in the words and figures following, to wit:

Subpœna in Chancery.

UNITED STATES OF AMERICA, }
Southern District of Ohio, } ss:

The President of the United States of America to the marshal of the southern district of Ohio, Greeting:

You are hereby commanded to summon Frank F. Creager, Harry M. Creager, and Jonathan Creager, citizens of and residents in the State of Ohio, if they be found in your district, to be and appear in

the circuit court of the United States for the southern district of Ohio aforesaid, at Cincinnati, on the first Monday in August next, to answer a certain bill in chancery filed and exhibited in said court against them by C. and A. Potts & Co., a corporation, citizen of and resident in the State of Indiana.

Hereof you are not to fail, under the penalty of the law thence ensuing; and have you then and there this writ.

Witness the Honorable Melville W. Fuller, Chief Justice of the United States, this 29th day of May, A. D. 1889, and in the 113th year of the Independence of the United States of America.

Attest:

[SEAL.] B. R. COWEN, *Clerk.*

MEMORANDUM.—The said defendants are required to enter their appearance in this suit in the clerk's office of said court on or before the first Monday of July, 1889; otherwise the said bill may
14 be taken *pro confesso*.

B. R. COWEN, *Clerk.*

And afterwards, to wit, on the 3rd day of June, A. D. 1889, the following appearance was filed in the clerk's office of said court, clothed in the words and figures following, to wit:

Appearance of Defendants.

U. S. Cir. Court, South. Dist. Ohio, W. D.

C. & A. POTTS & Co. }
vs. } In Equity. #4244.
FRANK F. CREAGER *et al.* }

I hereby enter my appearance for the defendants in the above-entitled case.

JAMES MOORE.
Resp'd'ts' Sol'c'r.

And afterwards, to wit, on the 15th day of June, A. D. 1889, came the marshal of the district to whom the aforesaid subpœna was in form directed, and filed the same in the clerk's office of said court, with his proceedings had thereon endorsed in the words and figures following, to wit:

Marshal's Return.

I received this writ at Cincinnati on the 29th day of May, 1889, and at said Cincinnati, Ohio, on the 1st day of June, 1889, I served the within-named Frank F. Creager, Harry M. Creager, and
15 Jonathan Creager each personally with a true copy of this writ, having all the endorsements thereon.

H. C. URNER, *U. S. Marshal.*
By C. A. COSTELLO, *Deputy.*

Fees.

3 services	$6 00
3 copies	1 50
2 miles	12
	87 62

And afterwards, to wit, on the 24th day of July, A. D. 1889, the following answer was filed in the clerk's office of said court, clothed in the words and figures following, to wit:

Answer.

15 In the United States Circuit Court for the Southern District of Ohio, W. D.

C. AND A. POTTS & CO.)
vs.) In Equity.
FRANK E. CREAGER *et al.*)

Joint and several answer of Frank F. Creager, Harry M. Creager, and Jonathan Creager to the bill of complaint of C. & A. Potts & Co.

To the honorable the judges of the United States circuit court for the southern district of Ohio, western division:

These defendants, saving and reserving to themselves all advantages and benefit of exception to the said bill of complaint, for answer thereto say:

Whether complainant is a corporation, as is stated in said bill, defendants have no knowledge, save the statement of said bill, and leave complainant to the proof thereof.

Defendants upon information and belief, admit that the three letters patent, Nos. 322,393, 368,898 and 384,278, upon which the bill of complaint is based were granted to the persons, and at the times, respectively, in said bill alleged; but as to whether said letters patent, or either of them, or any interest in, or to either, or any right of action arising out of any alleged infringement, or otherwise, of either, was ever assigned to said complainant, defendants
17 have neither knowledge, information or belief, and leave complainant to the proof thereof.

Defendants further answering deny that they have infringed said letters patent or either of them. They deny that they have made, used or sold any one or more clay disintegrators containing or employing the alleged inventions, or any or either of them, or any part of either, set out in said letters patent, and further say that they are manufacturers of various kinds of machinery for brick-making, and, among others, they manufacture "clay-pulverizers," under the authority of letters patent Nos. 380,245 and 385,342 for "clay-pulverizers," granted to said Jonathan and Harry M. Creager and dated respectivly March 27th, 1888, and July 3d, 1888; and

that such parts of said pulverizers as are not of the invention of said defendants, or some of them, are old and not covered by any other letters patent.

Defendants, upon information and belief, deny that there is any patentable novelty in any of the alleged inventions set out in either of the said letters patent Nos. 322,393, 368,898 or 384,278, and further deny that said alleged inventions, or any of them, in the light of the state of the art existing at the times of the respective applications for said several letters patent, involved any invention.

Defendants further answering deny that the said several alleged inventions, set out in said letters patent Nos. 322,393, 368,898 and 384,278, were not in public use or on sale more than two years prior to the several applications for said letters patent respectively.

18 Defendants further answering, upon information and belief, deny that Clayton and Albert Potts were joint inventors, and further that they were the first and original inventors of any or either of the alleged inventions set out in said letters patent Nos. 322,393 or 368,898, or that said George Potts was the original and first inventor of any or either of the alleged inventions set out in said letters patent No. 384,278, and allege that long prior to time of said alleged inventions respectively the same were, and each of them was, fully described in many letters patent of the United States, and among others, in the following, to wit:

No. 11422. To Isaac Gregg, for brick presses, August 1, 1854.

No. 15618. To H. B. Ramsey, for brick machine, August 26, 1856.

No. 49714. To R. Butterworth, for grinding apples, September 5, 1865.

No. 53598. To Clinton Frost, for grinding cylinders, April 3, 1866.

No. 74000. To L. E. Ranson, for brick machine, February 4, 1868.

No. 110,927. To I. & W. D. Mayfield, for grinding mills, January 10, 1871.

No. 125,159. To Alexander and others, for machines grinding clay, April 2, 1872.

No. 189,887. To E. S. Blake, for rolls for pulver-ing mills, April 24, 1877.

No. 242,387. To J. W. Smith, for wheat-grinding apparatus, May 31, 1881.

No. 276,992. To J. C. Anderson, brick machine, May 8 1883.

19 No. 291,654. To G. Van Name, for roller for grinding mills, January 8, 1884.

No. 304,038. To Secrest & Vuncanan, for brick machines, August 26, 1884.

No. 320,905. To Alsip & Drake, for clay-crushing machine, June 30, 1885.

And were, and each of them was, fully described in many English letters patent, and among others, the following, to wit:

No. 764. Granted Weston Grinshaw, September 27, 1861.

No. 634. Granted John Platt and William Richardson, March 12, 1864, for improvements in machinery or apparatus for breaking up or pulverizing clay for the manufacture of bricks or other such articles, "x x" etc. Specification filed September 12, 1864.

No. 1671. Granted Edwin Cook, James Bambroffe and Thomas Baker, May 11, 1874, for "improvements in clay mills, etc.," specifications filed November 4, 1874.

No. 3353. Granted Andrew Lamberton, August 3, 1881, for "improvements in crushing and pulverizing machinery." Specifications filed February 1, 1882.

Defendants further deny that any other matter or thing contained in said bill, and material for these defendants to make answer unto, is true, to the knowledge or belief of these defendants, and they pray to be hence dismissed with their costs.

FRANK F. CREAGER.
HARRY M. CREAGER.
JONATHAN CREAGER.

JAMES MOORE.
Respondents' Solicitor and Counsel.

20 UNITED STATES OF AMERICA, } ss:
Southern District of Ohio, Western Division,

Before me, the subscriber, a notary public, personally appeared the above-named defendants, Frank F. Creager, Harry M. Creager and Jonathan Creager, who, being duly sworn, depose and say, that the statements contained in their within answer are true, except where they are stated to be upon information and belief, and them they believe to be true.

JONATHAN CREAGER.
HARRY M. CREAGER.
FRANK F. CREAGER.

Sworn to before me and subscribed in my presence this 24th day of July, 1889.

FRANCIS M. BIDDLE,
Notary Public in and for Ham. Co., O.

(80c. paid notary by respondents.)

21 And afterwards, to wit, on the 28th day of August, A. D. 1889, the following replication was filed in the clerk's office of said court, clothed in the words and figures following, to wit:

Replication.

In the United States Circuit Court for the Southern District of Ohio, W. D.

C. AND A. POTTS AND CO., Complainant,
vs.
FRANK F. CREAGER *et al.*, Defendants. } In Equity.

Replication.

This repliant, saving and reserving unto itself all and all manner of advantage of exception to the manifold insufficiencies of the said answer, for replication thereunto saith that it will aver and prove its said bill to be true, certain and sufficient in the law to be answered unto, and that the said answer of the said defendant is uncertain, untrue and insufficient to be replied unto by this repliant; without this that any other matter or thing whatsoever in the said answer contained, material or effectual in the law to be replied unto, confessed and avoided, traversed or denied, is true; all of which matters and things this repliant is, and will be, ready to aver and prove, as this honorable court shall direct; and humbly prays, as in and by its said bill it hath already prayed.

C. & E. W. BRADFORD,
Solicitors for the Complainant.

And afterwards, to wit, on the 11 day of Nov., A. D. 1889, the following deposition was filed in the clerk's office of said
22 court, clothed in the words & figures following, to wit:

In the United States Circuit Court for the Southern District of Ohio, W. D.

C. AND A. POTTS & Co., Complainant,
vs.
FRANK F. CREAGER, HARRY M. CREAGER, and JONATHAN CREAGER, Defendants. } In Equity.

James Moore, Esq., attorney for Jonathan Creager's Sons, Cincinnati, O.

DEAR SIR: Please take notice that on Tursday, the 7th inst., commencing at 1.30 p. m., at our offices at the city of Indianapolis, Indiana, before Harold Taylor, notary public, we shall commence the examination of Oscar W. Bond, Esq., of Chicago, Ill., as a witness on behalf of the complainant in the above-entitled cause, the examination to continue from day to day until completed.

You are invited to be present and cross-examine.

C. & E. W. BRADFORD,
Attorneys for C. and A. Potts & Co.

Indianapolis, Ind., Nov. 4, 1889.

Service accepted at Cincinnati, Ohio, this 5th day of November, 1889.

JAMES MOORE,
Attorney for Jonathan Creager's Sons.

23 In the United States Circuit Court for the Southern District of Ohio, W. D.

C. AND A. POTTS & Co., Complainant,
vs.
FRANK F. CREAGER, HARRY M. CREAGER, and JONATHAN CREAGER, Defendants. } In Equity.

Stipulation.

It is hereby stipulated and agreed by and between counsel for the respective parties hereto, that all testimony herein may be taken before any notary public, and that uncertified printed copies of letters patent of the United States may be used in testimony with the same force and effect as if certified.

C. & E. W. BRADFORD,
Solicitors for Complainant.
JAMES MOORE,
Solicitor for Defendants.

24 In the United States Circuit Court for the Southern District of Ohio, W. D.

C. AND A. POTTS & Co., Complainant,
vs.
FRANK F. CREAGER, HARRY M. CREAGER, and JONATHAN CREAGER, Defendants. } In Equity.

Testimony taken on behalf of complainant in the above-entitled cause, pursuant to the notice to defendants hereto annexed, before Harold Taylor, notary public, at room 16 Hubbard block, in the city of Indianapolis, Indiana, commencing at 1.30 p. m. on the 7th day of November, A. D. 1889.

Present: Ernest W. Bradford, on behalf of complainant; James Moore, Esq., solicitor for defendants.

Counsel for complainant offers in evidence a certified copy of the articles of incorporation of the C. and A. Potts and Co., marked Complainant's Exhibit A.

Counsel for complainant offers in evidence a printed copy from the United States Patent Office of letters patent of the United States, No. 322,393, which is marked Complainant's Exhibit B.

Counsel for complainant offers in evidence a certified copy of a patent deed under letters patent of the United States No. 322,393, which is marked Complainant's Exhibit C.

25 Counsel for complainant offers in evidence a printed copy from the United States Patent Office of letters patent of the

United States No. 368,898, which is marked Complainant's Exhibit D.

Counsel for complainant offers in evidence a certified copy of a patent deed under letters patent in the United States No. 368,898, which is marked Complainant's Exhibit E.

Counsel for complainant offers in evidence a trade catalogue of brick machinery bearing the name of Jonathan Creager's Sons, Cincinnati, Ohio, U. S. A., pages 16, 17 and 18 of which are marked Complainant's Exhibit F.

Counsel for complainant here offers in evidence a drawing representing four views of a clay-disintegrator, which is marked Complainant's Exhibit G.

OSCAR W. BOND being called as a witness on behalf of complainant herein, being first duly sworn, in answer to interrogatories proposed to him by ERNEST W. BRADFORD, deposes and says as follows, to wit:

Question 1. Please state your name, age, residence and occupation.

Answer. Oscar W. Bond; age 43; residence, Chicago; occupation, solicitor of patents.

Q. 2. Please state what experience you have had, if any, in examining patents, mechanical drawings and comparing them with mechanical structures and illustrations.

A. For the past twenty years I have been engaged in preparing and prosecuting applications for patents and during that time
26 have examined and become familiar with mechanical drawings and various machines, devices and appliances. I have also examined machines of various kinds in connection with patents both as to infringement and patentability and have been called as an expert in patent causes.

Q. 3. I hand you the Potts patent No. 322,393 and ask you to examine the same and state if you understand its subject-matter in construction and manner of operation.

A. I have examined said patent and understand the construction and operation of the machine therein shown and described.

Q. 4. I hand you Complainant's Exhibit F, and calling your attention to the illustrations on page 16 and at the top of page 18, ask you if you understand the construction of the machine there illustrated and described on page 17.

A. I do.

Q. 5. I hand you drawing marked Complainant's Exhibit G, and ask you to examine the same and state whether or not it is a correct illustration of the machine illustrated on the pages of the catalogue referred to in the last question.

A. The drawing is correct, and represents the machine referred to on pages 16, 17 and 18 of Exhibit F.

Q. 6. Referring now to the claims of patent 322,393, Complainant's Exhibit B, do you find in the machine illustrated in the drawing Exhibit G and catalogue Exhibit F, the elements of which said

claims or any of them are composed? If so state specifically which one or ones.

27 A. Patent No. 322,393, relates to an improved machine for finely dividing and tempering clay, and the object of the improvement is stated to be to disintegrate the clay by means of a revolving cylinder and such cylinder is shown in the drawing and described as a cylinder having a series of scraping bars fitted into longitudinal grooves in the periphery of the cylinder. Such bars being adjustably secured in position. This feature or element of the invention in patent 322,393 is pointed out or summed up in the sixth claim of said patent. A machine of the construction referred to on pages 16, 17 and 18 of Exhibit F and illustrated in the drawing Exhibit G embodies the subject-matter of the sixth claim of patent 322,393, for such machine has therein, and for use in disintegrating clay, a cylinder having a series of longitudinal grooves and scraping bars adjustably secured in such grooves. It is true that the grooves of the cylinder in the patent do not extend through the cylinder while in the drawing, Exhibit G, such grooves extend through the cylinder. But such change is merely mechanical and the machine of the drawing, Exhibit G, contains in my opinion the combination of elements called for by the sixth claim of patent 322,393, as it has the cylinder, the longitudinal grooves and adjustable scraping bars located in such grooves for the purpose specified in the patent.

Q. 7. I hand you copy of U. S. patent 368,898 and ask you to examine the same and state if you understand its subject-matter in construction and operation?

28 A. I have examined said patent and understand the construction and operation of the machine shown and described therein.

Q. 8. In connection with said patent I ask you to examine the illustrations on pages 16 and 18 of Exhibit F, and the drawing Exhibit G, and comparing the machine there illustrated with that which forms the subject-matter of said patent, point out the similarities in construction, if you find any, and state whether or not the machine illustrated in Exhibits F and G contains the elements of the claims, or any of them, of said patent?

A. The invention of patent 368,898 relates to clay-disintegrating and has for its object the co-operating with a revolving cutting cylinder of a plain-surface cylinder set opposite to the cutting cylinder and revolving therewith in close proximity for the purpose of feeding, shredding and discharging the clay in an even manner, and in readiness to be taken directly to the pug and other mills. The cutting cylinder is one having on its per-phery a series of cutter bars set in longitudinal channels or grooves of the cylinder, and the coacting cylinder is one having a plain surface, and this cylinder not only feeds the clay but presents it for cutting while the cutting cylinder coacts therewith in feeding as well as performing the cutting operation. The specifications and drawings clearly describe and show the invention of patent 368,898, and the subject-matter of the rotating cylinder with cutting bars and a smooth-face rotating cyl-

inder adapted to carry and hold the clay against the cutting cylinder is pointed out or summed up in the first and second claims of this patent 368,898. Upon examination, the machine on pages 16, 17 and 18 of Exhibit F and illustrated in the drawing, Exhibit G, clearly contains, in my opinion, the subject-matter of claims one and two of patent 368,898, for in such machine there is found a rotating cylinder longitudinally grooved and carrying cutting bars projecting beyond the grooves, and such cylinder is in combination with a smooth-face rotating cylinder which will carry and hold the clay against the cutting cylinder by which the clay will be cut to shreds and passed between the two cylinders in the same manner as by the devices of the first claim of patent 368,898. The machine, likewise contains a main supporting frame and a rotating cylinder fixed therein and having longitudinal cutting bars projecting beyond the face of such cylinder and a positively revolving companion cylinder placed opposite to the cutting cylinder in the frame with a smooth face or surface to co-operate with the cutting bars directly and shred or clip the clay as it is fed and passed between the cylinders in the same manner as with the elements of the second claim of patent 368,898. I am, therefore, for the reasons given, clearly of the opinion that the machine referred to on pages 16, 17 and 18 of Exhibit F and shown in the drawing, Exhibit G, has therein the combination of parts summed up in claims one and two of patent 368,898.

Cross-examination.

Questions by Mr. MOORE:

X Q. 9. What difference of an inventive character do you find between claims one and two of patent 368,898?

A. Claim one does not specify any particular location of the smooth-face rotating cylinder, while claim two specifies such cylinder as positively revolving and fixed opposite to the cutting cylinder.

X Q. 10. Is it possible that the smooth cylinder could be placed otherwise than is specified in claim two, and for another portion of a question would a smooth cylinder that was not a positively revolving cylinder answer any useful purpose in the machine shown in the patent in question?

Counsel for complainant objects to this and the last preceding question as immaterial and not cross-examination.

A. Claim one makes the distinction referred to in the question and it is apparent from that that the inventor did not wish to confine himself to the special location of the second claim. A positively revolving cylinder would, in my opinion, operate in a more satisfactory manner than a cylinder not so driven.

X Q. 11. The purpose of the last question was to enable you to state what there was of difference in these combinations that amounts to difference of invention in your opinion. And you will please

now, without accentuating particular words in the claims or repeating literalisms, answer that question.

Objection repeated.

A. The purpose of the claim, as I understand, is to sum up or point out the special feature or novelty of an invention. The first claim of patent 368,898 points out a cutting cylinder having cutting bars and a coacting, plain surface cylinder, and this without reference to their particular relation so long as the two coact to produce the stated object of shredding, feeding and discharging
31 the clay. The second claim points out as the novel features the cutting cylinder with its cutting bars and the plain surface cylinder to coact therewith, and definitely locates the two cylinders in their relation one to the other, and this difference is the difference between the first and second claims of this patent 368,898.

X Q. 12. Is there any difference of an inventive character between the cylinder and the cutting bars of patent 322,393 and the cylinder with its cutting bars of patent 368,898? If there is, what is it?

A. Not as cylinders with cutting bars. There is a slight change in the manner of holding the cutting bars in place.

X Q. 13. Do you regard it as constituting invention to add a companion roll to another roll well known in the art, or would you so regard it, assuming the cutting roller of the Potts patent to have been old at the time of the grant of patent 368,898?

Counsel for complainant objects to the foregoing question and all examination of such a character as immaterial at this stage of the proceedings and not cross-examination, no foundation for such examination being found in the direct examination.

A. Most certainly, if the addition of such roller performs, in connection with the other roller, an office and enables a result to be attained which could not be attained with the one roller alone.

X Q. 14. When the word roller is suggested to mechanics in connection with its use for the purpose of rolling material of any
32 kind, does not the word itself suggest another or companion roller to enable it to perform its functions?

Objection repeated.

A. Not necessarily. The roller suggests possibly some coacting face or surface.

X Q. 15. And the ordinary coacting surface for a roller is usually understood to be a roller, is it not?

Objection repeated.

A. No, sir. The coacting face of a printing press roller is often a flat traveling bed.

X Q. 16. Then I understand you to mean that if a roller, such as is shown in patent 322,393, or such a roller as is shown in patent 291,654 granted Van Name was shown to you, you would be at a

loss to know what was the proper sort of device for it to coact with, is that what you mean?

Objection repeated.

A. Without knowing for what special purpose such roller was designed it would be hard to determine.

X Q. 17. Suppose you are informed when either of these rollers was shown to you that it was to be used for disintegrating clay, would you still have a difficulty in stating what sort of coacting surface it ought to have in order to properly perform its functions?

Objection repeated.

A. It could perform its functions with a number of devices one of which is a cylinder as shown and described in patent 368,898.

And further the witness saith not.

(Signed) OSCAR W. BOND.

33 STATE OF INDIANA, } ss:
County of Marion, }

I, Harold Taylor, a notary public within and for the county of Marion and State of Indiana, do hereby certify that the foregoing deposition of Oscar W. Bond was taken on behalf of C. & A. Potts & Company, in pursuance of the notice hereto annexed, before me at the office of C. & E. W. Bradford, room 16 Hubbard block, in the city of Indianapolis, in said county, on the 7th day of November, 1889; that said witness was by me duly sworn before the commencement of his testimony; that the testimony of said witness was written out by Miss Minnie Carpenter in my presence; that the opposing party, Frank F. Creager, *et al.*, was present by their counsel James Moore, Esq., during the taking of said testimony; that said testimony was taken at the office of Messrs. C. and E. W. Bradford, room 16 Hubbard block, and was commenced at 1 o'clock p. m., on the 7th of November, 1889, and was concluded on the same day; that I am not connected by blood or marriage with either of said parties; nor interested directly or indirectly in the matter in controversy.

In testimony whereof, I have hereunto set my hand and affixed my seal of office, at Indianapolis, in said county, this 9th day of November, 1889.

[SEAL.] HAROLD TAYLOR,
Notary Public.

34 COMPLAINANT'S EXHIBIT A.

By these articles of incorporation, the undersigned to hereby certify:

That they have associated themselves together for the purpose of engaging in the business of manufacturing and in accordance with the statute in such cases made and provided, do execute the following certificate, to wit:

First. The corporate name adopted by said company is "C. and A. Potts and Co."

Second. The object of the formation of said corporation is to engage in the business of manufacturing and dealing in machinery.

Third. The amount of capital stock shall be ($12,000.00) twelve thousand dollars, divided into (240) two hundred and forty shares of $50.00 each.

Fourth. The term of existence of said corporation shall be twenty years.

Fifth. The number of directors shall be (4) four, and the following-named parties shall act as directors for the first year and until their successors are elected and qualified, viz: Clayton Potts, Albert Potts, Lindley Vinton and Merrick E. Vinton.

Sixth. The business of said corporation shall be carried on in the city of Indianapolis, Marion county, Indiana.

In witness whereof the said Clayton Potts, Albert Potts, and Lindley Vinton have hereunto set their hands this 5th day of December, 1885.

CLAYTON POTTS. [SEAL.]
ALBERT POTTS. [SEAL.]
LINDLEY VINTON. [SEAL.]

35 STATE OF INDIANA, } *set:*
County of Marion, }

Before me, the undersigned, a notary public within and for said county and State, on this 5th day of December, 1885, personally appeared the above-named Clayton Potts, Albert Potts and Lindley Vinton and acknowledged the execution of the above and foregoing certificate of incorporation.

Witness my hand and notarial seal this 5th day of December, 1885.

[SEAL.] WILLIAM A. KETCHAM,
Notary Public.

736-35. Articles of incorporation of the "C. and A. Potts and Co." Filed 12, 9, '85. W. R. Myers, sec. of state.

Certificate.

STATE OF INDIANA, } *ss:*
Office of the Secretary of State, }

I, Charles F. Griffin, secretary of state of the State of Indiana, do hereby certify that the annexed and foregoing is a full, true, and complete copy of the articles of incorporation of "C. and A. Potts and Co.," filed in the office of the secretary of state of the State of Indiana on the ninth day of December, 1885, as the same appears of record in this office.

In witness whereof, I have hereunto set my hand and affixed the seal of the State of Indiana, at the city of Indianapolis, this 3d day of October, A. D. 1889.

[SEAL.] CHARLES F. GRIFFIN,
Secretary of State.

(No Model.) 2 Sheets—Sheet 1.

C. & A. POTTS.

CLAY DISINTEGRATOR.

No. 322,393. Patented July 14, 1885.

Exhibit "B"

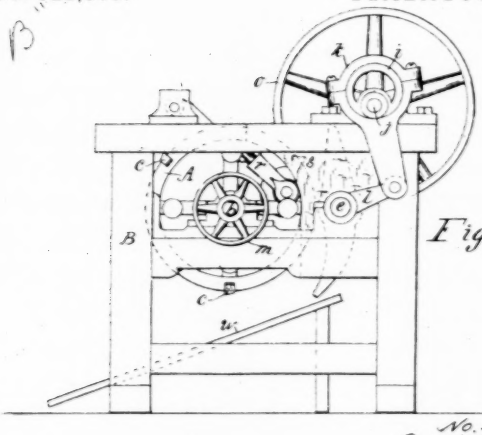

Fig. 2.

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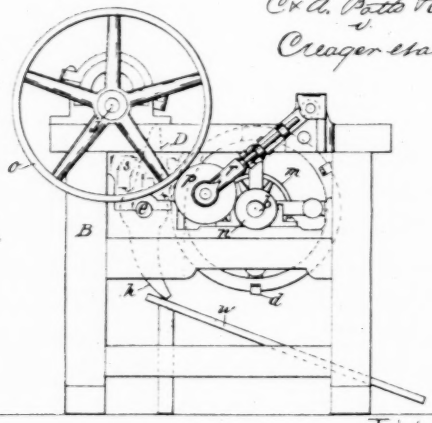

Fig. 1.

WITNESSES:
C. M. Hood.
M. Carsten

INVENTORS:
Clayton Potts
Albert Potts.
By H. P. Hood
Atty

(No Model.) 2 Sheets—Sheet 2.

C. & A. POTTS.

CLAY DISINTEGRATOR.

No. 322,393. Patented July 14, 1885.

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Creager et al

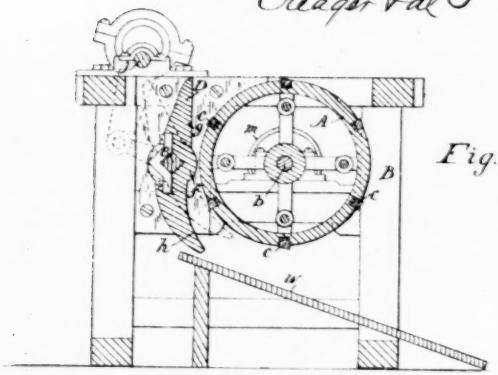

Fig. 4.

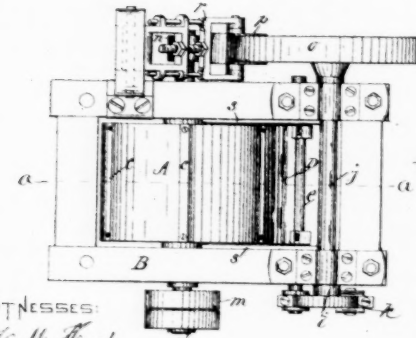

Fig. 3.

WITNESSES:
C. M. Reed
M. Carsten

INVENTORS:
Clayton Potts
Albert Potts
By C. P. Reed
Atty.

38 UNITED STATES PATENT OFFICE.

CLAYTON POTTS and ALBERT POTTS, of Indianapolis, Indiana.

Clay-disintegrator.

Specification forming part of Letters Patent No. 322,393, dated July 14, 1885. Application filed April 25, 1885. (No model.)

To all whom it may concern:

Be it known that we, Clayton Potts and Albert Potts, citizens of the United States, residing at Indianapolis, in the county of Marion and State of Indiana, have invented a new and useful improvement in clay-disintegrators, of which the following is a specification:

Our invention relates to an improved machine for finely dividing and tempering clay.

The object of our improvement is to disintegrate the clay by means of a revolving cylinder, which shall remove successive portions from a mass of clay which is automatically pressed against the cylinder, as hereinafter fully described.

The accompanying drawings illustrate our invention.

(Here follow diagrams marked pp. 36 & 37.)

Fig. 1 is a side elevation. Fig. 2 is an elevation showing the opposite side. Fig. 3 is a plan. Fig. 4 is a vertical section at *a*, Fig. 3.

A is a cylinder mounted on a shaft, *b*, having suitable bearings on the frame B. Said cylinder is of such length as to nearly fill the space between the sides of the frame. A series of steel bars, *c c*, are fitted into longitudinal grooves in the periphery of the cylinder, where they are secured by flush screws at each end, or other suitable means, whereby they are adjusted so as present a sharp corner, *d*, Fig. 1, projecting above the surface of the cylinder. Opposite cylinder A a strong plate, D, is mounted on a shaft, *e*, so as to swing in bearings on the frame B. The central part, *f*, of said plate is cylindrical in outline, the upper portion, *g*, presents a straight surface, and the lower portion, *h*, presents to the cylinder a curved surface corresponding to the periphery of the cylinder. Plate D is caused to oscillate in its bearings by means of an eccentric wheel, *i*, on a shaft, *j*, mounted in suitable bearings on the frame, and connected by a yoke, *k*, with an arm, *l*, secured to shaft *e*. Motion is given to shaft *b* by a belt running over driving-pulley *m*, and shaft *j* is revolved by means of friction-gearing, consisting of a wheel, *n*, secured to shaft *b*, a wheel, *o*, secured to shaft *j*, and an intermediate wheel, *p*, mounted on a short shaft having bearings in a swinging adjustable frame, *r*. The opposed sides of cylinder A and the upper and central portions of plate D form, together with sheet-metal end plates, *s s*, which are secured to the frame, a trough, one side of

which approaches and recedes from the other at intervals, and which has at the bottom a narrow opening, *t*, of constant width.

The operation of our machine is as follows: Plate D being swung back to the position shown in dotted lines Fig. 4, the moist, untempered clay is thrown into the trough above mentioned. Cylinder A, revolving rapidly, successive portions are removed from the mass of clay and carried through the opening *t* by the scraping-bars *e*, at the same time the upper portion of the plate D moves slowly toward the cylinder, thus keeping the mass of clay in close contact with the cylinder as successive portions are removed. The force with which plate D is removed toward the cylinder is regulated by drawing the intermediate friction-wheel, *p*, more or less closely in contact with the wheels *n* and *o* by means of the screw-nut *u*, thus lengthening or shortening the frame *r*, the purpose being to cause enough friction between the wheels to move plate D sufficiently to keep the clay in contact with the cylinder, and also to slip when necessary to prevent undue pressure against the cylinder. The finely-divided clay, after passing through opening *t*, falls upon the lower curved portion of plate D, and from thence to the incline *w*. If the clay is quite moist, some of it will adhere to the curved portion of the plate, and will again be brought in contact with the cylinder as the upper portion of the plate recedes to receive a new supply of clay, and will thus be removed.

It is desirable at times in disintegrating dry or nearly dry clay or other like substance to feed the mass to the cylinder without great pressure. For this purpose we disconnect the yoke *k* and arm *l*, and throw wheel *p* out of engagement with the wheel *o*. By turning wheel *o* by hand plate D may now be set at a suitable angle, as that shown in dotted lines, Fig. 4, or any intermediate angle between that and the position shown in full lines, so that the mass is fed to the cylinder by force of gravitation alone.

We claim as our invention—

1. In a clay-disintegrator, a supporting-frame, a cylinder arranged to revolve, and a swinging plate, both mounted in
39 said frame, and forming opposite sides of a trough for the reception of clay, and means for swinging said plate alternately towards and from said cylinder, all combined substantially as specified.

2. In a clay-disintegrator, a supporting frame, a cylinder arranged to revolve and having scraping bars attached to its periphery, and a swinging plate, both mounted in said frame and forming opposite sides of a trough for the reception of clay and means for swinging said plate alternately towards and from said cylinder, all combined substantially as specified.

3. In a clay-disintegrator, a supporting frame, a cylinder arranged to revolve and having scraping bars attached to its periphery, and an inclined plate, both mounted in said frame and forming opposite sides of a trough for the reception of clay, all combined substantially as specified.

4. In a clay-disintegrator, the combination, with the revolving cylinder, of the swinging plate, consisting of a central cylindrical

portion, an upper straight portion, and a lower curved portion, all substantially as specified.

5. The combination, with the supporting frame, the revolving cylinder, and the swinging plate, of the shaft *j*, eccentric *i*, yoke *k*, arm *l*, and wheels *n*, *o*, and *p*, substantially as and for the purpose specified.

6. In a clay-disintegrator, the combination, with cylinder A, having a series of longitudinal grooves, of the scraping bars *c*, and adjustably secured in said grooves for the purpore specified.

CLAYTON POTTS.
ALBERT POTTS.

Witnesses:
H. P. HOOD.
LINDLEY VINTON.

40 COMPLAINANT'S EXHIBIT C.

DEPARTMENT OF THE INTERIOR,
UNITED STATES PATENT OFFICE.

To all persons to whom these presents shall come, Greeting:

This is to certify that the annexed is a true copy from the records of this office of an instrument in writing executed by Clayton Potts and Albert Potts March 4, 1886, and recorded in Liber W 33, page 496.

Said record has been carefully compared with the original and is a correct transcript of the whole thereof.

In testimony whereof I, C. E. Mitchell, Commissioner of Patents, have caused the seal of the Patent Office to be affixed this [SEAL.] 14th day of June, in the year of our Lord one thousand eight hundred and eighty-nine, and of the Independence of the United States the one hundred and thirteenth.

C. E. MITCHELL,
Commissioner of Patents.

Patent Deed.

Whereas, we, Clayton Potts and Albert Potts, of the city of Indianapolis, county of Marion and State of Indiana, did obtain letters patent of the United States for certain new and useful improvements in clay-disintegrators, which letters patent bear date the 14th day of July, A. D. 1885, and are numbered 322,393; and,

41 Whereas the C. and A. Potts and Co., of the same place, a corporation duly organized under the laws of the State of Indiana, is desirous of acquiring the entire interest in said letters patent.

Now this indenture witnesseth, that for and in consideration of six thousand dollars, to us in hand paid, the receipt whereof is hereby acknowledged, we have assigned, sold and set over, and do hereby assign, sell and set over unto the said C. and A. Potts and Co., their assigns, successors and legal representatives, all the right,

title and interest which we have in said invention as secured to us by said letters patent, the same to — held and enjoyed by the said C. and A. Potts and Co. for its own use and behoof, and to the use and behoof of its assigns and legal representatives, to the full end of the term for which said letters patent are or may be granted, as fully and entirely as the same would have been held and enjoyed by us if this assignment and sale had not been made.

And we do hereby declare that we have not conveyed to any other party the right and interests transferred by this instrument.

In witness whereof we have hereunto set our hands and affixed our seals, this 4th day of March, A. D. 1886.

CLAYTON POTTS. [SEAL.]
ALBERT POTTS. [SEAL.]

In presence of—
JACOB HENRY.
CHAS. FAUST.

Exhibit D

(No Model.)

C. & A. POTTS.

CLAY DISINTEGRATOR.

No. 368,898. Patented Aug. 23, 1887.

Fig. 1.

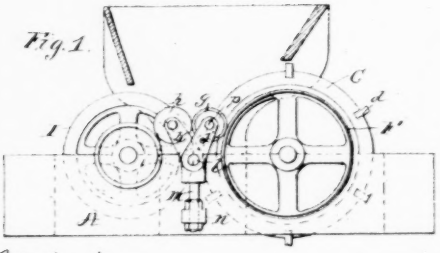

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Fig. 4.

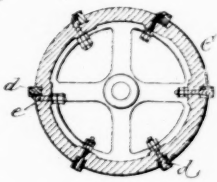


Fig. 2.

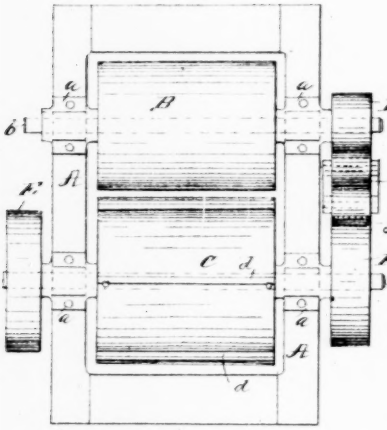
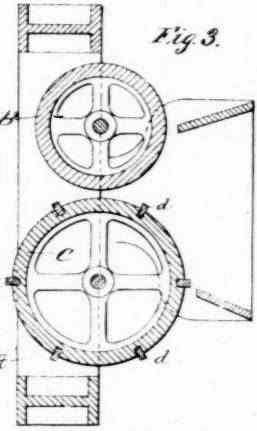


Fig. 3.



Witnesses.
W. Houston
Wm. Rheem.

Inventor:
Clayton Potts and Albert Potts
by Louis Fisher Atty.

43 UNITED STATES PATENT OFFICE.

CLAYTON POTTS and ALBERT POTTS, of Indianapolis, Indiana.

Clay-disintegrator.

Specification forming part of Letters Patent No. 368,898, dated August 23, 1887. Application filed October 18, 1886. Serial No. 216,472. (No model.)

To all whom it may concern:

Be it known that we, Clayton Potts and Albert Potts, of Indianapolis, in the county of Marion, State of Indiana, have invented certain new and useful improvements in clay-disintegrators, of which the following is hereby declared to be a full, clear, and exact description.

Our invention relates to disintegrators of that class employed in the preparation of clay for the manufacture of brick, tile, and the like; and it consists more especially of certain improvements in the construction of disintegrators such as is set forth in our letters patent No. 322,393, dated July 14, 1885.

In lieu of the swinging plate shown by said patent, co-operating with the revolving cutter-cylinder, we design to employ a plain cylinder set oppositely to the cutting-cylinder and revolving therewith in close proximity, so that the raw clay may be fed, shredded, and discharged in an even and continuous manner, in readiness to be taken directly to the pug or other mill. The drive-pulleys mounted on the respective axes of the cylinders are in operative connection through the medium of friction-pulleys bearing thereon, so that if the movement of the two cylinders in course of revolution shall be seriously arrested or impeded by stone or the like choking in the throat of the mill the friction-gear will serve to relieve the strain by slipping upon the cylinder-pulleys.

The invention consists, further, in certain detail improvements in the construction and arrangement of the frictional driving mechanism and in the plan for securing the cutter-bars within the seats of the shredding-cylinder.

In the accompanying drawings—

(Here follows diagram marked p. 42)

Figure 1 is a view in side elevation, the feed-trough being shown in section, of a disintegrator embodying our improvements. Fig. 2 is a top plan view thereof, and Fig. 3 a view in longitudinal vertical section. Fig. 4 is a detail view in cross-section of the cylinder having the cutter-bars seated therein.

Within the usual boxes and bearings, *a*, of the frame A are seated the axles *b* and *c* of what may be termed for distinction "feed-cylinder" B and the "cutting-cylinder" C, although, as will hereinafter appear, the cylinder B not only feeds the clay, but presents it

for cutting, while the cylinder C not only cuts the clay, but coacts with the cylinder B in feeding the same continuously through the machine. These cylinders are preferably of metal, and are arranged in near relation to each other, so that the clay passing between them shall be finely divided or shredded. For this purpose the cutting-cylinder C is provided about its face with a series of cutter-bars, *d*, which, in the form shown, consist of straight steel plates set in the channels or longitudinal grooves of the cylinder C. There may be liners of soft metal arranged in the cylinder-seats below the cutter-bars *d*, to secure an even bearing and adjustment for said bars. Bevel-like kerfs cut in the bars near the outer ends thereof contact with the correspondingly-beveled faces of the bolts *e*, projecting through the cylinder C, and provided with the set or lock nuts at the inner ends thereof. By screwing down the nuts on the bolts *e* the cutter-bars *d* will be drawn snugly and securely to their seats in the cylinder C, and be thus retained firmly in place.

It is manifest that by having the bars removable, as shown, they may be taken out when worn or broken and new ones substituted in place thereof. Slight inequalities in the wear of the cutter-bar *d* may be compensated by the use of the liners, as above indicated. Instead of having the bars replaceable, they may be cast in piece with the cylinder C, although such form is not to be preferred, because on wear or breakage of the projections *d* the entire cylinder must be dispensed with. Instead of having the cutter-bars straight and mounted in longitudinal channels across the entire length of the cylinder C, such bars may be short and set in staggered or zigzag fashion across the face of the cylinder. Whatever kind of cutter-bar *d* be adopted, the purpose is to arrange such bars so as to project slightly from the face of the revolving cylinder C and barely clear the face of the opposite cylinder, B. Under this arrangement, as the cylinder revolves, the bars *d* cut away the clay in successive shred-like portions as the same is pressed against the cylinder. It will be understood that the diameter of the feed-cylinder B may be larger or smaller than that of the cutting-cylinder C, or, again, that both cylinders may be made of the same diameter. By having the cutting-cylinder C smaller in diameter than that of the
44 feed-cylinder B the cutting-cylinder may be caused to revolve more rapidly than the companion cylinder B to effect an even feed at the same time that the cutters are presented in quick succession to more finely shred or divide the passing clay. A pulley, F, secured to the opposite end of the axle *c* and rotating therewith imparts movement, by the idler-pulleys *g* and *h*, to the pulley I, secured to the axle of the feed-cylinder B. The idler-pulleys *g h* are mounted in swinging arms or frames *j k*, moving pivotally upon a through-bolt or stud-like pivot, L, projecting from the head of the standard *m*, which latter passes through an eye *n*, of the frame A.

It will be seen that the pulleys F and I are respectively in frictional contact with the idler pulleys *g h*, which latter in like manner are in frictional contact with each other. By adjusting the standard through the set and jam-nuts resting upon the supporting eye *n*, the idler pulleys *g h* are made to bear more or less firmly

against each other and against the pulleys F I respectively, by which means the degree of frictional contact and driving strain between the cutting cylinder C and the feed-cylinder B may be varied.

During the ordinary operations of the machine in shredding the clay the frictional contact of the various pulleys named will serve to drive the cylinders and to shred the clay as desired. If any obstruction should be encountered tending to choke or clog the space between the two cylinders the frictional contact of the driving pulleys will permit a slip to occur, so that strain on the parts and the danger of breakage which are incurred were the two cylin-
45 ders to be positively geared together by the ordinary tooth pinion are avoided.

As before stated, the machine shown in our letters patent No. 322,393 was provided with a swinging or vibrating plate to coact with the cutting cylinder in effecting the shredding of the clay which was fed between them. In such machine the abutting surface of the vibrating plate furnished a rest or bearing for the clay in presenting the same to the action of the cutter knives. This abutting surface was limited in extend and unchanging in position, so that it became rapidly worn. By substituting the revolving roll for the vibrating plate this objection is greatly lessened. The roll constantly presents new surfaces to the cutters, so that the wear is even and regular throughout its circuit. If any inequalities exist in the roll at the outset these become rapidly reduced, so that by use the cylinder wears more and more true, and acts thus with constantly better effect. Aside from cheapness in construction, the revolving roller or cylinder machine will work wet or sticky clays with perhaps one-third of the power necessary in treating such clays in the vibratory-plate machine. Such plate tends constantly to crown or squeeze the passing clays, whereas the revolving roll yields continuously, so that clogging is less apt to occur at the same time that the clay is finely and evenly shredded, the cutter cylinder moving, by preference, more rapidly than the companion feed-roll in order to accomplish this effect.

Prior to our invention it has been very common to employ in clay mills, sugar mills, and the like a set of rolls between which the material passed as the rolls were revolved; but in such machines the operation of the rolls was merely to break up the clogs of clay and squeeze or crush the same, whereas by our invention the
46 clay is positively cut into fine shreds or clippings in much better condition to be tempered and molded than by the old forms of disintegrating machines.

We do not wish to be understood as claiming broadly the use of a friction gear to control the strain upon the operating parts of a clay-disintegrator. Such kind of gearing is shown and described in our patents No. 322,393, but there only in connection with the swinging plate and cutter cylinder. By our present improvements such friction gear is modified in construction and adapted for use in conjunction with the companion rolls, and our present invention is restricted to the new combination of such rolls and friction gear.

Having thus described our invention, what we claim as new and desire to secure by letters patent is—

1. In the supporting frame of a clay-disintegrator, a rotating cylinder longitudinally grooved and carrying cutting bars in and projecting beyond the grooves in combination with a smooth-faced rotating cylinder adapted to carry and hold the clay against the cylinder having the cutting bars thereon, which latter cut or shred the clay and pass the same between the cylinders, substantially as set forth.

2. In clay-disintegrators, the combination with the main supporting frame and with a rotating cylinder fixed therein and having longitudinal cutting bars projecting beyond the face thereof, of a positively revolving companion cylinder fixed opposite thereto in said frame and having a smooth face or surface, with which said cutting bars directly co-operate to shred or clip the clay as the same is fed by and passed between said cylinders, substan-
47 tially as described.

3. In a clay-disintegrator, the combination with the main or cylinder pulleys of the intermediate pulleys mounted in oppositely swinging arms and means, substantially as described, to adjust the position of said arms, whereby the frictional contact of said pulleys with each other and with the cylinder pulleys may be varied, substantially as described.

CLAYTON POTTS.
ALBERT POTTS.

Witnesses:
JOHN W. CLAYPOOL.
LINDLEY VINTON.

48 COMPLAINANT'S EXHIBIT E.

DEPARTMENT OF THE INTERIOR.
UNITED STATES PATENT OFFICE.

To all persons to whom these presents shall come, Greeting:

This is to certify that the annexed is a true copy from the records of this office of an instrument in writing, executed by Clayton Potts and Albert Potts, May 25, 1889, and recorded in Liber X 39, page 449.

Said record has been carefully compared with the original and is a correct transcript of the whole thereof.

In testimony whereof I, C. E. Mitchell, Commissioner of Patents, have caused the seal of the Patent Office to be affixed this 14th day of June, in the year of our Lord one thousand eight hundred and eighty-nine, and of the Independence of the United States the one hundred and thirteenth.

[SEAL.] C. E. MITCHELL,
Commissioner of Patents.

Patent Deed.

Whereas, Clayton Potts and Albert Potts, of the city of Indianapolis, Marion county, Indiana, did obtain letters patent of the United States, for certain new and useful inventions in clay-disintegrators, which letters patent are dated the 23d day of August, A. D. 1887, and are numbered 368,898;

And whereas, the equitable title to said letters patent is now, and has been ever since their said date, properly the property of
49 the C. and A. Potts and Co., a corporation created and organized under the laws of the State of Indiana, and located and doing business at the city of Indianapolis, in said State;

And whereas, it is now desired to vest the legal title in the said C. and A. Potts and Co.:

Now this indenture witnesseth, that for and in consideration of the sum of one dollar to us in hand paid the receipt whereof is hereby acknowledged, we, the said Clayton Potts and Albert Potts, have assigned, sold and set over, and do hereby assign, sell and set over unto the said C. and A. Potts and Co., its assigns successors and legal representatives, all the right, title and interest which we have in said invention as secured to us by the said letters patent, together with all choses in action arising under or growing out of said letters patent, and all rights of recovery of damages or profits for any manufacture use or sale of said invention, or any infringement of said letters patent, against any and all party or parties whomsoever; meaning to convey all said rights as completely and effectually, and vest them fully as and entirely, to all intents and purposes, in the said C. and A. Potts and Co., as though this transfer and assignment had been made at or before the date of said letters patent;

The same to be held and enjoyed by the said C. and A. Potts and Co., for its own use and behoof, and to the use and behoof of its assigns and legal representatives, to the full end of the term for which said letters patent are or may be granted, as fully and entirely as the same would have been held and enjoyed by us if this assignment and sale had not been made.

In witness whereof, we have hereunto set our hands and affixed our seals, at the city of Indianapolis, Indiana, this 25th day of May, A. D. 1889.

CLAYTON POTTS. [SEAL.]
ALBERT POTTS. [SEAL.]

Witnesses:
C. BRADFORD.
C. W. H. BROWN.

(Here follows diagram marked p. 49.)

50 And afterwards, to wit, on the 11 day of January, A. D. 1890, the following stipulation was filed in the clerk's office of said court, clothed in the words and figures following, to wit:

Stipulation.

In the United States Circuit Court for the Southern District of Ohio, W. D.

C. AND A. POTTS & Co., Complainant,
vs.
FRANK F. CREAGER, HARRY M. CREAGER, and JONATHAN CREAGER, Defendants. } In Equity.

Stipulation.

It is hereby stipulated and agreed by and between counsel for the respective parties hereto, that defendants may file an amendment to their answer herein on or before January 15, 1890; that defendants may take their testimony herein any time before February 15, 1890, and that complainant's bill herein may be considered and treated as if amended, by the cancellation of all reference therein to patent No. 384,278, issued to George Potts on the 12th day of June, 1888.

C. & E. W. BRADFORD,
Solicitors for Complainants.

Indianapolis, Ind., January 8, 1890.

JAMES MOORE,
Solicitor for Defendants.

Cincinnati, O., January 9, 1890.

51 And afterwards, to wit, on the 11th day of January, A. D. 1890, the following amended answer was filed in the clerk's office of said court, clothed in the words and figures following, to wit:

Amended Answer.

In the United States Circuit Court for the Southern District of Ohio, W. D.

C. & A. POTTS Co.
vs.
FRANK F. CREAGER *et al.* } In Equity. No. 1244.

Amended answer of defendants Frank F. Creager, Harry M. Creager, and Jonathan Creager in above-entitled cause.

And now come the respondents, and, by leave of this honorable court, first had and obtained, amend their answer as follows:

First. To be taken as inserted upon the fourth page of said original answer and following the fifth line thereof.

No. 207,717. To Jonathan Creager for "improved wood-polishing machine," September 3, 1878.

No. 130,079. Albert Schaht, "coffee crushing, or crushers," July 30, 1872.

No. 116,039. To Moore R. Fletcher, "pulp engines, or crushers," June 20, 1871.

No. 225,976. To George H. Ennis, "machine for preparing paper pulp," March 30, 1880.

No. 105,728. To Rose & Gibson, "separating fibre from cotton-seed husks," July 26, 1870.

No. 66536. To William H. Thomas, "machine for grinding clay," July 9, 1867.

52 No. 160,618. To Daniel Rudy, "clay-pulverizer," March 9, 1875.

No. 57280. To John Blackie, "machine for pressing tobacco," August 20,1866.

No. 30462. To Ezekial Gaile, "hemp brakes," October 16, 1860.

No. 33119. To John R. Whittemore, "feed-cutters," August 20, 1861.

No. 52472. To T. J. Wells, "peat machine," February 6, 1866.

No. 29463. To David B. Caldwell, "straw-cutters," August 7, 1860.

No. 39767. To Israel F. Brown, "cotton gin," September 1, 1863.

No. 61932. To Warren Gale, "straw-cutter," February 12, 1867.

No. 92997. To George H. Peabody, "cotton-seed huller," July 27, 1869.

No. 297,764. To John M. Case, "feed-box for roller mills," April 29, 1884.

2. To be taken as inserted upon said fourth page of the original answer, after the allegation or statement of the English letters patent to Andrew Lambertine.

And were, and each of them was, also shown and described in divers prior printed publications and among others in the following, to wit: In figure 6864 and accompanying description upon the 2681 page of a certain printed publication entitled as follows: "Knight's American Mechanical Directory: a description of tools, instruments, machines, processes and engineering; history 53 of invention; general technological vocabulary, and digest of mechanical appliances in science and the arts. By Edward H. Knight, civil and mechanical engineer, etc. Vol. 3d xx. New York: Published by Hurd & Houghton, Cambridge; the Riverside Press. 1876."

And in figure 262 and accompanying description on page 89 of a printed publication, supplemental to the above, and marked "section one" on the cover thereof, and otherwise entitled substantially as the foregoing is, except as to the publishers' names and date, which are as follows: "Boston: Houghton, Mifflin & Co., New York, 11 East 17th street; the Riverside Press, Cambridge. 1882."

"And further answering respondents say, that long prior to said alleged inventions of and by the said Potts the same were well known and publicly used in divers places in the United States, and, among others, at the shop or factory of George Pelstring, on the canal, near Walnut street, in the city of Cincinnati, in the district and division thereof aforesaid; which use was known, among others, to the re-

spondent Jonathan Creager, George H. Stallo and Joseph Kemper, each and all of whom reside in said Cincinnati.

"Respondents pray as they have heretofore prayed.

"JONATHAN CREAGER.
"FRANK F. CREAGER.
"HARRY M. CREAGER."

JAMES MOORE,
Respondents' Solicitor and Counsel.

54 UNITED STATES OF AMERICA, } *ss:*
Southern District of Ohio, Western Division, }

Frank F. Creager, Harry M. Creager and Jonathan Creager, respondents above named, being first duly sworn upon their respective and several oaths, say that they have read the foregoing amended answer and know the contents thereof, and that the same is true, except where it is alleged upon information and belief, and in such cases they believe it to be true.

JONATHAN CREAGER.
FRANK F. CREAGER.
HARRY M. CREAGER.

Sworn to and subscribed in my presence this 19th day of December, 1889.

[SEAL.] FRANCIS M. BIDDLE,
Notary Public in and for Hamilton County, O.

SOUTHERN DISTRICT OF OHIO, *ss:*

A true and correct copy of the original on file in this office.
Attest: B. K. COWEN, *Clerk.*
By ROBERT C. GEORGE, *Deputy.*

55 And afterwards, to wit, on the 6th day of February, A. D. 1890, the following deposition on behalf of defendants was filed in the clerk's office of said court, clothed in the words & figures following, to wit:

Defendants' Depositions.

Circuit Court of the U. S. for the Southern Dist. of Ohio.

C. & A. POTTS & CO. }
vs. } In Equity. =4244.
FRANK F. CREAGER *et al.* }

The complainants will take notice that the respondents will examine Jas. W. Lee and others, witnesses in the above-named cause, under the 67th rule in equity, as amended, before Buchanan Perin, Esq., notary public, in the office of Jas. Moore, in Pike's building, Cincinnati, O., on Tuesday, the 4th day of Feb., 1890, beginning said

examination at 10 o'clock a. m. of said day and continuing from day to day until completed.

JAMES MOORE,
Sol'r for Resp'd'ts.

Received copy.
Jan. 28, 1890.

C. & E. W. BRADFORD,
Sol'r for C. & A. Potts & Co.

56 Circuit Court of the United States for the Southern District of Ohio.

C. & A. POTTS & Co. *vs.* FRANK F. CREAGER *et al.* } No. 4241. In Equity.

Depositions in pursuance of the annexed notice, taken in the above-entitled cause, to be read on behalf of defendant, taken at the office of James Moore, Pike's building, Cincinnati, Ohio, on the fourth day of February, 1890.

Present: Upon behalf of complainant, E. W. Bradford, Esq., and on behalf of respondents, James Moore, Esq.

JAMES W. SEE, a witness of lawful age, being introduced by respondents and first duly sworn, testifies as follows:

Q. 1. State what experience you have had in the examination of devices, and in the study and comparison of printed descriptions and drawings of letters patent and otherwise, and more particularly state whether you have had any, and what experience in the field of roller mills, grinding mills, and cognate arts.

A. I reside in Hamilton, Ohio, and am by profession a consulting mechanical engineer. I have served an apprenticeship at the machinist trade, and after its completion worked at the trade for a number of years in a number of shops. I have had much practical experience in connection with the designing and construction of grinding mills of the roller and other types.

57 As consulting engineer, it becomes my duty to pass upon the merits of new machines and designs for proposed new machines. In connection with this work letters patent play an important part, an important question often being, what is the relation of the proposed structure to existing patents? This branch of my work had brought me into close contact with patents, and I have also, in a great many cases, acted as solicitor of patents where points of novelty have presented themselves. From my early boyhood I have been a close student in mechanical matters, and have, I think, kept abreast of the times. I am frequently called upon to testify in litigations involving matters of patents and mechanism.

Q. 2. Have you examined, and do you understand, the two letters patent numbered respectively 322,393 and 368,898, granted C. & A. Potts for clay-disintegrator?

A. I have, and believe that I do.

Q. 3. Referring to said Potts' patent No. 322,393, which has been called Complainants' Exhibit B, will you please state what of novelty you find in the sixth claim of said patent, as compared with the state of the prior art? And in this connection, and for the purpose of greater certainty, you may refer to the exhibits that are lying before you.

A. The patent referred to relates to a machine for dividing and tempering clay. Lumps or masses of clay put in the machine become broken up, cut or disintegrated, and prepared for further operations in other apparatus as may be desired. For instance, the clay thus reduced may go to the appropriate machinery for massing the disintegrated clay into tiles, bricks, or other articles.

The machine may be briefly described as a rotary reducing cylinder operating on the lumps of clay, supported against an opposing abutment, the reducing cylinder being armed with cutters
58 which attack the masses of clay and reduce it in fineness. Machines of this type have long been quite common in the art, and the patent in suit, No. 322,393, relates, so far as the sixth claim is concerned, exclusively to the manner of arming the reducing cylinder with cutting instruments.

The reducing cylinder has a number of longitudinal grooves in its periphery, and scraping bars or blades are secured in these grooves with their edges projecting a trifle from the plain periphery of the cylinder. These projecting edges attack the masses of clay.

The specification describing this feature of construction says:

"A series of steel bars, *c*, *c*, are fitted into longitudinal grooves in the periphery of the cylinder, where they are secured by flush screws at each end, or other suitable means, whereby they are adjusted so as to present a sharp corner, *d*, Fig. 1, projecting above the surface of the cylinder."

This is the entire description furnished of the feature under consideration.

The claim inquired about reads as follows:

"6. In a clay-disintegrator, the combination, with cylinder A, having a series of longitudinal grooves, of the scraping bars *c*, adjustably secured in said grooves, for the purpose specified."

The claim would thus appear to refer to and point out, and be responded to by a cylinder provided with grooves and with scraping bars or blades adjustably secured in those grooves. The word "adjustably," as used in this claim, is somewhat vague. The term is generally understood as meaning "capable of being shifted from one to another desired position." But such shifting is not referred to in the specification, nor is any desirability for such shifting indicated, nor is any means for effecting such shifting pointed out. However, the scraping blades are shown in the drawing as being held in the grooves by screws, and it would be within the range of ordinary mechanical skill to place strips of metal, generally called liners, under the blades to effect any desired degree of adjust-
59 ment. The specification, speaking of the screws which secure the scraping blades, says: "whereby they are adjusted so as

to present a sharp corner," etc. The term "adjustably" might therefore be taken as having been possibly used in the sense of mere separability and attachability. That is to say, the blades may be adjusted into the machine or out of the machine. Or, as before mentioned, the term may imply an adjustment for greater or less projection from the cylinder, well-known mechanical means being relied on, without mention, for the purpose.

In determining the novelty of the matter thus pointed out, the question thus reduces itself to this: was it new to form a bladed cutting cylinder by longitudinally grooving the cylinder and adjustably securing cutting blades in those grooves, by means of screws "or other suitable means," so that the blades would project their edges properly beyond the periphery of the cylinder, so that the cylinder, in its rotation against a mass, would cause the projecting blades to attack that mass successively.

Long prior to this patent it was common, in a great variety of arts, where a mass was to be operated upon by blades projecting from a rotary cylinder, to provide such cylinder with separable longitudinal blades secured in its periphery.

In the Exhibit "Butterworth Patent, 49714," the general machine is substantially like that of the patent in suit, but intended for the reduction of apples to a pulp. Regarding its cutting cylinder, the specification states: "This cylinder is hollow—and having a set-screw E in each end of them, to secure the knives or cutters D in position. These knives or cutters are formed out of a single plate of steel, which have chisel-shaped edges, and are adjusted so as to project beyond the periphery of the cylinder C, the projections being secured in position, as previously stated, by the set-screws E." "The knives, when they require sharpening, may be taken out from the cutters C and reset in a short time and without any difficulty whatever."

60 Fig. 2 of the drawing shows that the knives are seated in longitudinal grooves in the cylinder, and so also do the detached views Figs. 3 and 4, which show more clearly the arrangement of set-screws at the end of the knives for holding them in place. In the patent in suit the knives or scraper bars have holes through them and flush screws go through these holes and screw directly into the floor of the groove, while in the Butterworth patent, the set-screws E screw through lugs on the ends of the cylinder and bite with their points against the side faces of the blades. Both these methods of securing a removable piece in place have long been well known in the arts as the equivalents for each other, and the means set out in the Butterworth patent would appear to be fully comprehended by the language "or other suitable means" as employed in the patent in suit. The Butterworth patent would therefore appear to respond to the claim in suit in exhibiting a cylinder A, having a series of longitudinal grooves and scraping bars C adjustably secured in said grooves, for the purpose specified, the purpose specified being the projection of the scraping bars beyond the periphery of the cylinder so that the edges of the scraping bars may attack the mass against which the cylinder is oper-

ated. In the patent in suit, and in the Butterworth patent, the knives project radially from the cylinder, that is to say, the knife grooves are cut into the cylinder directly toward the center of the cylinder.

In the Exhibit Ennis Patent, 229,576, the rotary cutting cylinder is employed in reducing masses of paper stock to pulp. Fig. 3 shows clearly the arrangement of knives in the cylinder. The cylinder has radial grooves and the blades are held in these grooves and project beyond the periphery of the cylinder.

The specification does not describe any special construction of this cylinder for the simple reason that the construction was the same as was universal in this class of machines. I have had personal experience in the design and construction of these
61 pulping machines for many years prior to the date of the patent in suit, and the construction of the cylinder, or roll, as it was termed, was as follows: The cylinder was of wood and longitudinally grooved for the knives. The knives were steel plates tightly driven into these grooves, their edges projecting the desired distance from the periphery of the cylinder. No means were provided for adjusting the degree of projection except by regulating the depth to which the knives were driven down into the grooves. It was long common in the arts, where a separable piece was to be held with variable degrees of projection in another piece, to either fit the inserted piece loosely and secure it in desired position by a screw, or to fit the inserted piece tightly and depend upon its friction to hold it. The two methods are the equivalents of each other, and the method of the Ennis patent is fully comprehended in the language, "or other suitable means," of the patent in suit. The Ennis patent clearly responds to the language of the claim in question.

The Exhibit "Frost's Patent, 53598," sets forth another method of constructing the cutting cylinders of pulping machines. The patent first sets forth the method I have just described in connection with the Ennis patent and then goes on to explain the improvements. The cylinder is formed with end flanges which are grooved for the reception of the knives. The knives are seated in these grooves, precisely as if the cylinder surface extended from end to end of the cylinder, and on each side of each knife is disposed a long jaw plate between which the knives are clamped, all being held in position by rings at the ends of the cylinder engaging notches in the ends of the jaw plates. The intention is that the knives shall be clamped between the jaw plates which are firmly held, and by loosening the rings, the knives may be projected a greater or less distance from the periphery of the cylinder. The space between the knives was filled with strips of metal or wood so that the completed structure formed a complete cylinder longitudinally grooved for the knives, and knives adjustably se-
62 cured in those grooves. The invention is said to consist, "in so applying the grinding plates or knives that they may be moved outwardly from the circumference of the cylinder as fast as they wear." The construction set out in this Frost patent would

therefore respond to the claim in suit in that it presents a cylinder having a series of longitudinal grooves, and scraping bars adjustably secured in said grooves. The knives of the Frost patent were, like the patent in suit, arranged radially.

The Exhibit "Van Name Patent, 291,654," sets forth another construction of knife cylinder for grinding mills. The cylinder has two circumferential grooves, of dovetail form, and each knife blade has a lower projection for each of these grooves, and the cylinder has a number of longitudinal grooves. A knife is slipped into one of the longitudinal grooves and then moved circumferentially. Then blades of iron or wood are similarly placed against the knife, then another knife, then other intermediate blades, and so on till the cylinder is full. The intermediate blades, of iron or wood, are really filling strips, forming between them the grooves which hold the cutting knives. The knives can be renewed at any time, but no provision is made for adjusting the projection of their edges from the cylinder. If the word "adjustably" of the claim in question refers to means, not set forth in the patent in suit, for effecting a change in the degree of knife projection, then this Van Name patent does not respond to the claim. But if the word "adjustably" means simply capable of being adjusted into and out of the cylinder, that is, adjusted in place, then the Van Name patent responds fully to the claim, inasmuch as the cylinder has a series of longitudinal grooves and scraper bars separably inserted in said grooves. The knives of the Van Name patent, like that of the patent in suit, are radially arranged.

The Exhibit "Peabody Patent, 92997," sets forth a cutting cylinder for use in a cotton-seed mill. The cylinder is provided with
63 longitudinal grooves; the knives are seated in these grooves; there are slots in the knives; and screws go through these slots and into the cylinder and secure the knives in place, the slots permitting the knives to be adjusted for more or less projection from the cylinder. The knives and grooves, instead of being radial, as in the patent in suit, are arranged tangentially so as to give more of a cutting or chisel-like action. The screws, instead of screwing down upon the tops of the knives, as in the patent in suit, engage the flat side faces of the knives. The specification states:

"At equal distances apart, around the periphery of the cylinder, are arranged the adjustable knives *c*. The knives are inserted in cuts or grooves, made so as to give them a suitable inclination forward, and are fitted tightly therein, with a sufficient space left back of the knives for the insertion of wedge-shaped pins for adjusting them, so as to increase or diminish the cutting surface of the cylinder, as may be required; or if preferable, it may be done by a set-screw *d* passed through a slot in the knife, the head of the screw being countersunk in the cylinder."

I have had experience with the operation of cutting cylinders for a large number of purposes, and my opinion is, that it would not be a material departure from the patent in suit to arrange the knives and grooves tangentially instead of radially, both plans being equally common in the arrangement of cutting cylinders.

Nor does the language of the claim in question require that the knives and grooves shall be arranged radially. The Peabody patent responds to the claim, for it exhibits a cutting cylinder having a series of longitudinal grooves, and scraping bars adjustably secured in said grooves.

I have stated that the tangential arrangement of knives was equally common with the radial arrangement. The object of the tangential arrangement is to give the cutting blade a better cutting presentation to the mass which they are to attack.

The Exhibit "Mayfield Patent, 110,927," sets forth a reducing mill in which the knives of the cutting cylinder are arranged tangentially. The cylinder is longitudinally grooved and these
64 grooves extend entirely through the rim of the cylinder, forming slots therein. The knives project inwardly through these slots and are adjustably bolted inside the cylinder, the cutting edges of the knives projecting outwardly from the cylinder. These bolts engage slots in the knives so as to permit the adjustment of the projection. The Mayfields call their knives "plane bits," half the knives have straight cutting edges, the other half corrugated ones. Fig. 3 shows one of the corrugated knives with the bolt slot in its heel. This Mayfield patent would respond to the claim in question, for the reason that it presents a cylinder having a series of longitudinal grooves, and cutters adjustably secured in said grooves. If slots entirely through the shell of the cylinder are to be considered as materially different things from grooves or channels extending part way only through the shell, then, of course, the Mayfield patent will not respond to the claim.

The Exhibit "Smith Patent, 242,387," sets forth a reducing mill in which the cutting cylinder is substantially the same as that of Mayfield, the knives being arranged tangentially, and adjustably bolted, by screw and slot, within the cylinder while their cutting edges project outwardly through slots entirely through the rim of the cylinder. Smith's cylinder, however, instead of having the slots and knives the entire length of the cylinder, has the long knives made up of separate-length sections, each knife being about half the length of the cylinder. The specification says:

"A cylindrical shell E which is slotted longitudinally from its ends to the central flange or spokes D, to receive a series of knives F. The knives F are slotted transversely to receive the screws or bolts H, that secure the said knives to the lugs, brackets or flanges G, so that the said knives can be moved forward as they become worn. The knives F are thus arranged like plane irons, and their cutting edges project beyond the outer surface of the shell E."

Assuming the immateriality of the difference between a shallow groove and the slot entirely through the shell, and assuming the immateriality of the difference between a single knife
65 extending the entire length of the cylinder, and a similar knife made up of shorter longitudinal sections, then this Smith patent will respond to the claim in question, by having a series of longitudinal grooves, and knives adjustably secured therein.

Assuming the materiality of the differences just referred to, then the case will be the reverse.

In all of the matters which I have referred to, the cutting cylinder has been formed by inserting separable knives in its periphery. The advantage of this arrangement is, that it permits the use of hardened steel for the knives and soft cheaper material for the main cylinder; it permits the knives to be adjusted as worn; and it permits the ready removal and replacement of the knives. But in many cases, in most all of the arts employing these reducing cylinders, an alternative construction has been to form the knives integrally with the cylinder. This has generally been done by forming the cylinder of sufficiently hard material and then fluting it longitudinally so as to form the cutting edges. From my observation and experience with these reducing cylinders, and it has been quite extensive, I should say that the two plans were followed to about an equal extent; that is to say, there will be found in use about an equal number of solid reducing cylinders and cylinders with separable cutting edges.

The Exhibit "Rudy Patent, 160,618," will serve as an example of the solid reducing cylinders which I have referred to. This example is designed for the reduction of clay, and Fig. 4 shows one of the reducing cylinders. The cutting edges are not in the form of removable blades, but are formed integrally by the periphery of the fluted cylinder. The general organization of this machine is substantially like that of the patent in suit, a single reducing cylinder acting against the clay held to the cylinder by an abutment. I refer to this patent only for the purpose of giving a further example of the construction of reducing cylinders and for the
66 purpose of illustrating the choice which has long been open to the machine-constructor in forming his reducing cylinder, either by forming the knives integrally from the metal of the cylinder, or by longitudinally grooving the cylinder and securing the knives adjustably therein.

Your question asks me what I find of novelty referred to in the claim inquired about, and my answer must obviously be, for the reasons given, absolutely none, the prior art furnishing many examples of reducing cylinders provided with a series of longitudinal grooves and knives, or scraping bars, adjustably secured in said grooves, substantially as set forth in the patent in suit, and for the purpose of enabling those knives or bars to be inserted in or removed from the cylinder at will, and of enabling the degree of projection of the cutting edges of the knives beyond the surface of the cylinder to be adjusted.

Q. 4. You will please refer to the third volume of Knight's American Mechanical Dictionary, page 2681, to Fig. 6864, with accompanying description of said figure, and compare it with drawing and description on sheet here shown to you, and state whether or not the latter is an accurate representation of the former, as well in letter press as in figure?

A. I have, and it is.

Respondent here offers in evidence the sheet referred to in last question as "Respondent's Exhibit Extract from Knight's Dictionary No. 1."

Q. 5. You will please refer to Fig. 262 with accompanying description, on page 89 of Knight's New Mechanical Dictionary, appearing to have been printed in 1882, and in this connection you will please compare sheet here shown to you, and state whether it is an accurate representation of said Fig. 262, with the accompanying description?

A. I have made the comparison suggested. The dictionary article in question refers to a number of machines for reducing beet roots, the machines having "cylindrical drums furnished with knives acting upon upon the roots placed in a hopper, which partially incloses the circumference of the rasping cylinder." Among the machines illustrated and described is that of Kluseman, and the sheet you mention is correctly copied from the dictionary, both as to text and drawing, and contains all of the matter pertaining to that machine.

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Respondent herewith offers in evidence sheet referred to in last question, to be marked "Respondent's Exhibit Extract from Knight's Dictionary No. 2."

Counsel for complainant consents that the sheets referred to in the last two preceding questions may be used in evidence in the place of the books from which they are copied. Further, that the book, volume 3, Knight's Dictionary, referred to, appears from the publisher's mark therein to have been published in the year 1876, and that the second book referred to appears from the publisher's mark therein to have been published in the year 1882.

Q. 6. State whether you know as to how long, respectively, the books just referred to have been printed and published.

A. I have in my library copies of both of the Knight's Dictionaries mentioned, identical in respect to the machines of the extracts, and I have had these books continuously in my possession since the respective years of publication indicated by their imprints. The copies received by me were among the first sent out by the publisher.

Q. 7. You will please examine the model I now show you and state how it compares as a reproduction of the machine shown and described in the Fig. 262 before referred to.

A. The model which you show me is a double model, two machines on one foundation. That one of these machine models which is operated by two belts is a proper and correct representation of the machine illustrated in said Fig. 262 of Knight. It is proper, however, to call attention to the fact that in the drawing of the dictionary, cog gearing is employed in transmitting the the rotary motions between the cutting cylinder and the feeding cylinder, the description stating that the cutting cylinder makes twenty-five revolutions to one revolution of the feeding cylinder. The model-maker, in making this model, has sought to avoid the mak-

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ing of cog gearing and has constructed the parts according to Knight, and has then arranged to give them their rotary motions by belt instead of cog gearing, the relative speeds being about as indicated by Knight. It will be understood, of course, that in illustrating merely the relative action of these two cylinders, it is immaterial just how the rotary motions are transmitted to them, belt gearing being equivalent to cog gearing for the purpose and serving fully the purpose of transmitting the motion. Therefore, so far as any matters of present interest are concerned, the model is a correct embodiment of the extract from Knight's Dictionary referred to.

Respondent herewith offers in evidence model last referred to and asks that it be marked "Respondent's Exhibit Model of Fig. 262, on page 89 of Knight's New Mechanical Dictionary."

Q. 8. You will please examine model that I now show you, and in connection therewith letters patent No. 320,905, granted Frank Alsip and Chester T. Drake for clay-crushing machine, June 30, 1885, and state how said model compares with the machine shown and described in the said patent.

A. I have made the comparison asked for. In all respects of interest in connection with the present inquiry, the model is a correct representation of what is set out in the patent.

Respondent herewith offers in evidence model last referred to and requests that it be marked "Respondent's Exhibit Model of Alsip & Drake Patent."

69 Counsel for complainant objects to the introduction of this model and all testimony based thereon, as incompetent.

Q. 9. You will please examine again the Potts patent No. 368,898, and which is marked "Complainant's Exhibit C" in this case, and state what you find that there is new shown or described in that patent as compared with the prior art; and for greater certainty, you may examine and refer to any exhibits before you in connection with any others that you may desire to refer to; and in this connection you may also refer to the model I now show you, marked "Respondent's Exhibit Creager's Wood-polishing Machine," a model not yet proved in the case, but said to accurately represent a machine in public use for many years prior to the complainant's invention, for polishing wood. For the purpose of your answer, you may limit your examination or comparison to the invention or inventions set out in the first and second claims of said Potts patent.

Counsel for complainant gives notice that unless the model referred to in the last question shall hereafter be duly proved as competent evidence, he will object to its use herein and to any testimony based thereon.

A. This Potts patent, like the other Potts patent in suit, relates to a mill for reducing clay by the action of a revolving cylinder provided with peripheral knives.

In the machine of the former patent, the cutting cylinder acted

on the clay while the clay lay between the surface of that cylinder and the surface of a non-cutting, opposing agent. That agent had the form of a cylindrical surface presenting itself near the cutting clylinder, a crack or space being formed between them, down through which the cut clay was passed and discharged for further treatment in other apparatus. The lump of clay, uncut, was supported
70 or arrested by these two cylindrical surfaces, and the forward sweep of the cutting knives attacked the mass and reduced it and carried it in its reduced state down through the crack referred to. The knives of the cutting cylinder performed, therefore, the double operation of cutting and feeding. The opposing, non-cutting cylinder was provided with two large vertical wings, D and *h*, the upper one of which projected upward and formed what might be called one wall of the hopper. The opposing agent, or what I have called the non-cutting cylinder, was not a complete cylinder, and was not a rotary device. It had the form of a cylinder only in the immediate neighborhood of the cutting cylinder, and it had an oscillating motion so that the wings referred to would exert an intermittent compressive action on the clay. Let it be noted particularly that this opposing agent was not a true feeding agent, for the reason that its cylindrical surface, against which the cutters acted, was not always moving in the advance direction, its oscillating motion causing it to pull the clay back as much as to urge it forward. The cutting cylinder had therefore to produce the feeding motion of the clay as well as to cut the clay.

The second patent, now under consideration, is stated to be an improvement on the former patent. The wings on the non-cutting cylinder were omitted and that smooth cylinder, instead of having an oscillating motion, is given a motion of continuous rotation in the advance direction. The specification states that the non-cutting cylinder may be either larger or smaller than the cutting cylinder, and the drawing shows the cutting cylinder as being the larger. It is stated that the advance movement of the surface of the non-cutting cylinder feeds the clay and presents it for cutting, the cutting cylinder coacting with the feeding cylinder. It is further stated that the cylindrical surface found in the opposing agent of the former patent was so limited in extent as to wear away rapidly, owing to its constant presentation, while the complete cylindrical surface of the opposing agent in the later patent in constant
71 forward movement, so as to present an extended surface to wear, would be much more durable. It is also stated that this form of opposing agent is cheaper, and that it requires less power.

The two claims you ask about, read as follows:

1. "In the supporting frame of a clay-disintegrator, a rotating cylinder longitudinally grooved and carrying cutting bars in and projecting beyond the grooves, in combination with a smooth-faced rotating cylinder adapted to carry and hold the clay against the cylinder having the cutting bars thereon, which latter cut or shred the clay and pass the same between the cylinders, substantially as set forth."

2. "In clay-disintegrators, the combination, with the main supporting frame, and with a rotating cylinder fixed therein and having longitudinal cutting bars projecting beyond the face thereof, of a positively revolving companion cylinder fixed opposite thereto in said frame and having a smooth face or surface, with which said cutting bars directly co-operate to shred or clip the clay as the same is fed by and passed between said cylinders, substantially as described."

The first matter of inquiry would appear to be as to the difference, if any, between the two claims. The first claim specifies that the cutting cylinder shall be longitudinally grooved and have cutting bars in the grooves, while the second claim merely specifies that the cutting cylinder shall have cutting bars. In view of the fact that the patent only sets forth one manner of providing the cutting cylinders with cutting bars, namely, the securing of the bars in longitudinal grooves, and in view of the fact that in the prior art that manner was old and well known, together with other equivalent manners, it would appear that this matter would not constitute a distinguishing difference between the claims. The second claim recites that the non-cutting cylinder must be fixed opposite the cutting cylinder, while such location is not recited in the first claim. But the first claim does recite that the non-cutting cylinder is to "carry and hold the clay against" the cutting cylinder. This would appear to imply the precise location recited in the second claim, to wit: "opposite thereto." This
72 matter can therefore not be viewed as matter distinguishing the claims from each other. The second claim recites that the non-cutting cylinder shall be "positively revolving," while the first claim recites only that it shall be a "rotating cylinder adapted to carry and hold the clay" against the cutting cylinder, the latter language, in my opinion, meaning and implying the same thing as the former language, as if the clay will not itself rotate the non-cutting cylinder forward, then it must be positively rotated in any case, and if the advancing clay will properly rotate this cylinder, then it could be positively rotated by the clay in any case. I am therefore unable to find any distinguishing differences between the claims which both appear to me to refer to the same matter, namely, a cutting cylinder armed with longitudinal knives and a contiguous non-cutting cylinder rotating and acting in conjunction therewith.

The question therefore presents itself, what of novelty is there in this arrangement?

Cutting rolls have long been employed in reducing mills. Sometimes these rolls have acted in conjunction with a companion roll, in which case they have been called double roller mills. The Patent Office classification of such mills, however, is "crushing rolls" which is somewhat arbitrary in view of the fact that but few of these mills, thus classified in the Patent Office, are really crushing mills, those employing one or more cutting cylinders most always producing a cutting action. It is where neither of the rolls have cutters or knives that the action is strictly a crushing or mashing action.

It should be understood, therefore, that the Patent Office classification of "crushing rolls" includes reducing mills in which one roll acts against another, whether the rolls be smooth, or whether one or both of them are armed with cutters.

Where, instead of a companion roll, a non-rotary or non-circular opposing agent is employed in conjuntion with a reducing
73 mill, the Patent Office has adopted the classification name of "cylinder and concave mills." This name is derived from the fact that the fixed opposing agent often has a concave form corresponding substantially with a portion of the periphery of the cutting cylinder. There have been many hundreds of patents issued in both of these classifications, and the general literature of the art, foreign and domestic, sets forth almost numberless examples of reducing mills of both types, that is, with two coacting rolls, and with one roll acting in conjuntion with a non-rotary opposing agent.

In modern milling the millstone has been abandoned, the new system following a gradual-reduction plan through a series of roller mills. Some of these mills are on the double-roll plan, and some on the cylinder and concave plan. In some of the double-roll mills employed in connection with grain and other substances, both rolls are smooth and revolve toward each other at equal speeds. In others, both of the rolls are provided with cutters and one of the rolls revolves at superior speed so as to act as a cutter, while the slow-moving roll acts as the feeder. The art will furnish examples of such mills of date far back of the patent in suit. I have had considerable to do, in a practical way, with reducing mills of the roller type, and have had personal knowledge of these matters I have indicated, for years prior to the Potts patent. To my knowledge, long prior to the date of that patent, it was a mere matter of judicious selection or choice, in connection with reducing mills, to determine whether the cutting cylinder should operate in conjunction with a non-notary opposing agent, or with a companion roll.

It was also a mere matter of choice to determine whether the cylinders employed to act in conjunction with each other should be smooth or provided with cutters, the choice depending upon the result which was to be produced by the reduction.

74 In Exhibit "English Patent 1671 of 1874," for a reducing mill for clay or other substances, we find such a choice before us. The inventors refer to older mills with smooth rolls, and state how they can be provided with cutting blades. In this particular case the inventors propose that the blades should have a spiral course along the cylinder. The object of this is to permit a scraper to be used without its catching on the cutting blades. The scraper being straight, and the blades spiral, it cannot drop in between them. The inventors state:

"This invention consists in adapting to the ordinary plain or cylindrical rollers employed in pulverizing, grinding, or reducing clay or other substances, any suitable number of iron, steel or other metal ribs fixed on the rollers so as to take a spiral or archimedian course, and secured at each end by metal rings, screw-bolts, or their equivalents. * * * or the rollers and ribs may be made in one

casting; the object of such arrangement being to disaggregate, pulverize, and reduce the material, and thus produce a fine clay, with the advantage of using up waste, and with an economy in steam, horse or manual power. One or more of these rollers are employed in a mill, and although specially applicable to pulverizing clay, they may be advantageously employed for the reduction of other substances."

This English patent clearly sets out a roller mill with smooth rolls as a basis. It goes further and points out the provision of one or more of the rolls with cutting blades secured to the roll by screws or their equivalents, or by being cast therewith. For many years, to my knowledge, and long prior to the Potts patent in suit, the spiral arrangement of cutters on reducing cylinders has been employed as an equivalent for straight ribs. So far as my observation has gone, the spiral arrangement is most common in roller mills, it being now almost universal. In view of the fact that the straight and spiral arrangements were thus the recognized equivalents of each other as mere cutting agents, it would appear that a mere spiraling of the knives would not take the cutting cylinder beyond the comprehension of the Potts patent in suit, which patent, while showing long straight knives, removably inserted in grooves in a cylinder, states that the knives may be cast integrally with the cylinder, and that the knives, instead of being long and straight, may be short or staggered or zigzag, "whatever kind of cutter bar, *d*, be adopted, the purpose is to arrange such bar so as to project sliglitly from the face of the revolving cylinder, *c*, and barely clear the face of the opposing cylinder, *E*."

Thus viewing the claims as comprehending longitudinal knives, whether exactly straight along the cylinder or spiral, as is equally common in reducing rolls, this English patent would appear to respond to the claim for the reason that it certainly indicates, first, an older roller mill with smooth cylinders; second, a reducing roll, provided with longitudinal cutters, and third, the employment of "one or more of these rollers" in a roller mill. This English patent fully comprehends two companion rolls operating together to reduce clay or other substances, and it fully comprehends the provision of either one or more of said rolls with longitudinal cutters secured to the cylinder by screws or "equivalent means."

In Exhibit "Gale Patent No. 61932," we have a machine of the double-roller type, a straw-cutter, in which the reduction is effected by the direct cutting action of a cutting cylinder against a smooth cylinder, both revolving together. The cutting cylinder has its knives secured in longitudinal grooves. The opposing cylinder is formed of rawhide. The specification states:

"The feed or material to be cut, being placed in the box within range or reach of the cutting and pressure cylinders, is drawn into the machine and cut off in the usual manner. The knives may be put on in any of the usual ways of so doing."

The knives are arranged with a slight spiral, as is quite common. The two cylinders revolve toward each other at equal speed, while in the Potts patent the gearing is illustrated as so arranged as to

drive the non-cutting cylinder at the greater speed. Potts' specification, however, states "that the cutting cylinder may be
76 caused to revolve more rapidly than the companion cylinder D." However this may be, the matter of relative speeds is not involved in the claim, not being referred to in any way.

Therefore, disregarding the matter of relative speeds, and disregarding the mere spirality of knives, the Gale patent would respond to the claim, for it sets forth a rotating cutting cylinder provided with longitudinal knives, in combination with a smooth-faced, positively driven rotating cylinder fixed opposite thereto and acting in conjunction therewith.

Exhibit "Whitemore patent, 33119," of 1861, sets forth an arrangement of straw-cutter similar to Gale's, here also a rawhide non-cutting roll being employed in conjunction with a cutting roll, which has longitudinal knives secured in longitudinal grooves.

"The knives in the cylinder B are held by forcing them into slots made in the cylinder, but may be held by screws or other means. These knives are so arranged that in their revolution their edges will merely touch the roll above for the purpose of cutting anything that may be brought between them."

The non-cutting roll is not positively driven, but turns only by the action of the knives or passing material. If the positive rotation of the non-cutting roll is material to the claims in question, then this Whitemore patent does not respond to those claims, otherwise it does, by reason of exhibiting a cutting cylinder having longitudinal grooves, knives secured therein and projecting from the surface thereof, and a non-cutting rotating companion cylinder set opposite the cutting cylinder and operating in conjunction therewith.

Exhibit "Blackie Patent, No. 57280, of 1886", for reducing strips of tobacco to smaller pieces, sets forth a pair of rolls E and F operating together and geared together to perform the reduction. Roll F is a smooth, non-cutting one, and roll E is provided with longitudinal blades. The knives are slightly spiral "another roller E, having a series of sperial knives *a*, projecting radially from
77 its periphery." "The knives should be so attached to the cylinder that they can be removed or added at pleasure." "The cylinder E and F should be geared together." Disregarding spirality of knives as immaterial, this Blackie patent would respond to the claims in question inasmuch as it exhibits a rotating cylinder provided with longitudinal cutters, operating in conjunction with an oppositely set, positively driven, non-cutting cylinder.

The further taking of these depositions is now adjourned to Wednesday, February 5th, 1890, at the same time and place.

BUCHANAN PERIN, *Notary.*

FEBRUARY 5th, 1890, 10 A. M.

The further taking of these depositions is now resumed persuant to adjournment.

Exhibit "Fletcher Patent, 116,639," of 1871, sets forth a reducing mill, or the rolls for one, rather, intended for operation on pulp.

He shows two mills each employing a pair of coacting rolls, the rolls being different, however, in each case. In Fig. 2 he shows a pair of rolls each of which is bladed, the blades having the form of non-cutting ribs which intermember with each other. They are integrally formed with the rolls.

But Fig. 3 shows another arrangement, one roll J being smooth, while the other roll H is provided with integrally formed bars, blades or ribs. The specification, after describing the arrangement of Fig. 2, states:

"Figure 3 shows an equivalent construction, in which H represents a cylinder, provided with depression I upon its periphery and revolving over a plain cylinder J, the cylinder H being constructed in sections like those of cylinder J."

The latter part of this quoted language means that the cutting cylinder H, instead of having its blades run its entire length, is formed of short sections as has been previously described
78 with reference to the arrangement of Fig. 2. I think the term "cylinder J" in the language quoted is a clerical error. It is stated:

"This device not only crushes the pulp more rapidly than by the ordinary arrangement of bars and bed plates, but it also preserves a longer and stronger fibre, thereby producing better and stronger stock."

The patent in suit expressly states that the blades may run the whole length of the cylinder, or that they may be short sections arranged along the cylinder. It also states that the blades may be cast integrally with the cylinder instead of being secured separably thereto. The claims of the patent in suit would therefore appear to comprehend these modifications as found in the Fletcher patent. Thus viewed, the claims of the patent in suit would be responded to by the Fletcher patent, which shows, in Fig. 3, a cutting cylinder having longitudinal cutter bars operating in conjunction with an oppositely located smooth cylinder which serves as the feeder and non-cutting abutment.

Exhibit "Alexander's Patent, 125,159," of 1872, is of interest in illustrating a reducing mill, for clay, etc., in which one reduction is effected in a double-roller mill having two rolls D D', both provided with blades, while a second reduction is effected between a pair of smooth rolls F and F'.

Exhibit "Wells Patent, 52472," of 1866, presents another example of double reduction, the first pair of rolls, H H' being smooth, while the second pair of rolls, E E are both armed with cutters. The patent is also of present interest by reason of the fact that of the two smooth rolls H H', one of the rolls is arranged to move at a higher peripheral rate of speed than the other.

"The cylinders H H' are geared together in this instance by gears of equal diameter, but the cylinders themselves are of unequal diameters, the lower cylinder H' being the larger, from which it follows that since both cylinders make their revolution in the same period of time, the surface of the lower cylinder H' will rub

against and slip on that of the upper. When the peat
79 falls against the cylinder, it is drawn between them as between feed rolls, the lower cylinder rubbing the peat against the upper cylinder with a paring and grinding action, for the reason that its surface moves with greater speed than that of the other. Instead of using rubbing cylinders of unequal diameters, cylinders of the same diameter may be employed by running them at different speeds. The action of the cylinders H H' on the peat is not like the action of ordinary pressure-rollers, but they, while feeding the peat forward in the machine, tear it apart, owing to the difference in the speed at which their peripheries move."

In this Wells patent, we have a reduction effected by a pair of cylinders running together and serving to feed the material forward, one of the cylinders running at superior speed so as to become an active agent in effecting the reduction, while the other cylinder acts as the abutment and as a feeding agent. It has long been known in the arts that the tearing or disintegrating action of this active cylinder may be increased, if desired, by providing it with cutters, and the art exhibits a large number of methods for so providing this cylinder with cutters. The disintegrating action of the Wells machine being desired; and that desire being realized by an active cylinder operating in conjunction with a companion feeding cylinder; and it being desired to increase the tearing action; and the provision of reducing cylinder with cutters being fully recognized as a proper means for securing such increase in effect; it would obviously be merely a mechanical expedient to so provide the active cylinder with cutters. Thus viewed in connection with the state of the art and in connection with a desire previously realized in reducing mill, this Wells patent would appear, without the exercise of invention in its modification, to respond to the claims of the patent in suit.

I have heretofore referred to the fact that in reducing mills, as exemplified in the modern flouring processes, it was quite common to employ pairs of rolls running together and effecting the reduction in the space between them, both rolls being sometimes smooth,
sometimes both provided with cutters, and sometimes one
80 smooth and one only provided with cutters. The cutting edges of the cutters were variously modified with a view to the desired condition of product. Sometimes the edges were acute, sometimes obtuse, sometimes sharp, and sometimes rounded, according to whether a cutting or shaving, or splitting or breaking, or cracking or mashing action was desired on the material.

Exhibit "Case Patent No. 297,764," of 1884, furnishes an example of such a reducing mill having one smooth roll and one cutting roll. The angles of the cutting edges in this case are obtuse. As usual in this class of machines, one of the rolls of the pair is carried in fixed bearings and is called the stationary roll, while the other is in adjustable bearings for the purpose of regulating the distance between the rolls. Both rolls are always positively driven, and at differential speeds, the cutting roll running the faster, the smooth roll being merely an abutment and feeding agent. The roll ar-

rangement of this Case patent was a quite common one, and the patent says little about it, the patent relating more expressly to other features of the mill. It states, however, "the pairs of rolls each comprise one smooth roll, 2, and one toothed, milled, or corrugated roll, 3." The mill is shown as being in duplicate, for double capacity. I am quite well posted as to the practical art in connection with such mills as this Case mill, and am able to state that it was the universal custom to drive both rolls positively, and the cutting roll the faster of the two. The patent in suit contemplates the formation of the cutters integrally with the cutting roll, and the Case patent therefore responds to the two claims in suit, inasmuch as it presents the rotary cutting cylinder operating in conjunction with an oppositely set positively driven smooth-faced companion cylinder, adapted to carry and hold the material against the cutting cylinder while the cutting cylinder operates on the material, and passes it between the cylinders.

81 It has long been recognized that the companion cylinder in connection with which a cutting cylinder operates is merely an abutment and feeding agent, though, if itself armed with cutters, it could become a cutting agent.

Exhibit "Voelk Patent 231,512," of 1880, is of some interest in illustrating this recognition. Voelk calls his two cylinders "burrs," and, instead of having long knives, their length is made up of short knives or cutters, as explained in the Potts patent in suit. Incidentally it may be stated that this Voelk patent illustrates a mill on the composite system, the action being that of a pair of rolls performing the first action, and a concave in conjunction with one of the rolls to perform the second action. Of the two rolls *C D*, *C* is geared to revolve much the faster.

"The burr *D* will move much slower than the burr *C*, hence, while the two burrs run in the same direction, their teeth are opposed to each other, and as one will run so as to make a number of revolutions, say four or five, while the other makes one, the result is that while the article being ground is continually drawn into the mill, it is more or less ground while passing between the rolls or burrs, and if the burrs are set close together the grinding will be quite fine, and for some articles all that would be required. One of the burrs will draw the article to be ground into the mill. The burr which does this work is the slow-moving burr, while the fast-running burr does the grinding. So it will be seen that one of the offices of the burr *D* is to serve as a feed-roll, and another office is to serve as a burr for grinding. Much of the same effect would be accomplished if the burr *D* were only a smooth or corrugated roller."

This machine is designed for the reduction of "grain, corn and cob feed, or bones, plaster," etc.

This Voelk patent exhibits to us a mill performing the reduction between a pair of rolls; the recognition of one of those rolls as an active cutting agent, and the other roll as a feeding agent; the fitting of the feeding roll for its mere feeding agency by making it smooth; and the driving of the cutting roll at a higher rate of

speed than its companion feeding roll. In view of the fact
82 that the Potts patent in suit comprehends the making of the cutters in short sections, and in view of the fact that it also comprehends the forming of the cutters integrally with the roll, this Voelk patent fully responds to the claims in suit, inasmuch as it presents a cutting cylinder operating in conjunction with an oppositely set, positively driven, lower-speeded companion cylinder, forming an abutment and aid in the feeding.

Potts patent, 322,393, of 1885, the earlier patent in suit in this cause, shows a reducing mill in which the cutting cylinder operates against a cylindrical abutting surface which is non-rotary. But the state of the art has long recognized the advantages incident to giving such abutting surface the character of a complete cylinder in continuous rotation, so as to aid in the feeding as well as to furnish a mere non-cutting abutment. The state of the art therefore fully comprehended the substitution of such complete cylinder continuously rotating as a substitute for the non-rotating partial cylinder found in the earlier Potts patent. Thus viewed, and thus modified in structure, without the exercise of anything in the way of invention, this earlier Potts patent would clearly respond to the claims of the later Potts patent in suit.

Exhibit "Alsip Patent, 320,905," of 1885, sets forth a reducing mill, for clay, in which two reductions are effected, the first reduction being effected by a cutting cylinder operating in conjunction with a smooth companion cylinder, and a second reduction being effected by two smooth cylinders. Let it be remembered that the Potts patent in suit refers to a machine for performing the first reduction, the specification stating that the clay is "discharged in an even and continuous manner, in readiness to be taken to the pug or other mill." This simply means that the discharged clay may go to a second mill, and it would not be a material departure from the patent to incorporate that second mill with the mill performing the first reduction.

The Alsip patent calls the cutting roller a "muller."

83 "Said muller H is grooved in the manner shown, to form teeth or sharp-pointed corrugations h^3, which serve, by the weight of said muller, to cut or crush the lumps of clay as the same are fed into the hopper J, preparatory to passing between the rollers C D."

Incidentally, the smooth roll against which the muller acts is of conical construction, but it is so set, with relation to the muller, that the contiguous faces forming the grinding crack are parallel, precisely as though this companion roll were itself parallel. The Exhibit "Model of Alsip and Drake Patent" clearly represents the construction. The side boards of the hopper have been omitted from the model for the reason that they were omitted from the patent drawing. Masses of clay put in the hopper become acted on at once by the cutting cylinders, and the bottom of the mass will rest on the smooth roll, and the muller will continue to act on the mass in the crack between the muller and the smooth roll, the clay being discharged between them and going on for subsequent treatment.

The muller has its cutters formed integrally in the cylinder, as comprehended in the Potts patent in suit. This Alsip and Drake patent clearly responds to the Potts claims in suit, inasmuch as it presents a cutting cylinder operating in conjunction with an oppositely set, positively driven, smooth-faced companion roll, whereby the clay is cut as the same is fed by and passed between said cylinders.

The Exhibit "Model Creager's Wood Polishing Machine" presents to us a revolving cylinder, armed with blades secured in longitudinal grooves in the cylinder and acting in conjunction with an oppositely set, smooth-face companion cylinder serving as an abutment. This machine, I understand, is designed for operating on boards passing between the bladed cylinder and the smooth compaion cylinder, the blades performing the active operation. It furnishes an example of the general organization now under inquiry, the special organization exhibited being such as to adapt it for its intended special purpose. But such organizations have
84 been adapted to numerous other special purposes, such as the reduction of masses of material fed between the two rollers. Such adaptation, for purposes of reduction, having been quite old in the art, and this special adaptation for operations on boards, being merely an appropriate arrangement of those prime details of the organization with which we are concerned; and it being assumed that a change in purpose calls for a reorganization of the prime details found in this board machine, it would appear that not invention, but the mere exercise of mechanical skill would be required in reorganizing the prime details of the board machine after the precise manner pointed out by the prior art, so as to adapt the board machine to the realization of the new purpose. The edges of the blade have a non-cutting character, but the state of the prior art fully contemplates that they shall be modified into sharp ones if a cutting action is desired. The rolls are arranged one over the other, but the prior art contemplates a horizontal arrangement as well as a vertical one, and the Potts patent in suit does not appear to be limited to the horizontal arrangement. The board distance between the bladed cylinder and the smooth companion cylinder may be too great for the desired purposes of mass reduction, but the prior art fully instructs us that the distance between the rolls is to be made to suit the work in hand. This Creager machine, when thus modified without the exercise of invention, would appear to respond to the claims in suit inasmuch as it presents to us a cutting cylinder operating in conjunction with an oppositely set, smooth-faced companion cylinder, between which two cylinders the intended action of the blades of the cutting cylinder takes place.

Exhibit "Creager Patent, "207,717," of 1878, illustrates this Creager model except in respect to the main or operating cylinder, which is shown in the model as provided with blades secured in longitudinal grooves, while in the patent that cylinder is entirely smooth.

85 I have heretofore referred to English patent No. 1671, of 1874, as instructing us that one or more of the smooth rolls of a reducing mill may advantageously be provided with blades longitudinally arranged and having a spiral course.

The Exhibit, "Extract from Knight's Dictionary No. 1," gives us an example of a machine organized in the manner just indicated. In this exhibit one roll has the spiral blades, and the companion roll, with which it coacts, has a smooth surface, and the two rolls are so geared together that the bladed cylinder moves at a comparatively high velocity. There are provisions for adjusting the dis-distance between the cylinders. For reasons previously given, I am of the opinion that the Potts patent in suit comprehends the spiral arrangement of knives. The exhibit now under consideration is intended for action on hides, and the rollers are vertically disposed, that is, one above the other; and not being needed, no hopper is provided. The state of the art clearly comprehends the horizontal disposition of the pair of rolls if desired, and it comprehends the provision of a hopper if needed. To modify the machine of this exhibit in those two respects would certainly involve nothing of invention, being the mere exercise of ordinary skill and the following of the plain teachings of the art. Thus viewed, the exhibit would clearly respond to the claims in suit by reason of presenting two cylinders revolving together and positively driven, one a bladed cutting cylinder to do the active work, and the other a smooth-faced companion cylinder to serve as an abutment and aid in the forward feeding.

I have heretofore pointed out, in connection especially with Exhibit Voelk Patent, the recognition of the fact that the companion cylinder in conjunction with which the cutting cylinder operates, is, primarily, a mere feeding agent, tending by its forward motion to draw and hold the material to the cutting cylinder and then aid in discharging the cut material between the cylinders. It will

86 be obvious that this mere feeding office is performed strictly by frictional contact of the smooth cylinder with the material. The smooth cylinder tends to rub or urge the material forward. But if that mere friction is insufficient, we may increase the action by arming the feeding cylinder with projections which will increase the urging tendency on the material. For instance, in the Voelk patent, the feeding cylinder is provided with blades, but Voelk says they may be omitted if not needed, thus producing a smooth cylinder, or the cylinder may have roughening corrugations.

Briefly, we have a full recognition of the feeding office of the companion cylinder, together with the teaching that if the smooth cylinder has not sufficient bite on the material, we may increase that bite by properly arming the cylinder, and conversely, if the armed feeding cylinder has a capacity beyond its duty, we may remove the arms and employ the cylinder smooth.

Some masses to be reduced are of a form and consistency readily lending themselves to forward urging by the mere friction of a smooth feeding cylinder, while some masses are of a character and

form which prohibits such a smooth cylinder taking a proper feeding-bite. For instance, in shredding beets, or similarly formed articles, they roll freely, and a smooth feeding cylinder would prove inefficient.

The Exhibit "Extract from Knight's Dictionary No. 2," furnishes an example of a reducing mill in which the positively driven, slow moving companion cylinder *e* is armed with flukes or projections to enable it the more readily to grasp the bodies which it is to hold and feed to the cutting cylinder and aid in feeding forward between the cylinders. Having this beet-shredding device at hand, and finding it to embody a hopper, a quick-moving cutting cylinder, and an oppositely set, slow-moving, positively driven, fluked companion cylinder, between which two cylinders the material is fed and acted upon by the cutting cylinder; and finding, from experience, or from the teachings of the prior art, that with a
87 given material in hand the arming of the companion cylinder is not needed; and finding in the prior art the teaching that the arming of companion cylinders may be omitted if not needed; and finding in the prior art numerous examples of smooth companion cylinders; certainly nothing more than the mere exercise of judicious selection and ordinary mechanical skill, as distinguished from invention, would be involved in substituting in this machine a smooth companion cylinder for the fluked one shown. The machine of this exhibit, thus modified without the exercise of invention, would clearly respond to the claims in suit inasmuch as it presents a reducing mill embodying a cutting cylinder operating in conjunction with a companion cylinder set opposite to it and positively driven at lower speed, and having a surface best adapted for feeding the material in hand.

Briefly, therefore, and for the reasons given, I can discover nothing of novelty pointed out in the claims inquired of those claims setting forth merely old elements, having the old construction, and arranged in the old manner, and operating in the old manner, and producing the old result, precisely as taught us in the prior art.

Counsel for complainant objects to those portions of the foregoing answer based upon the Voelk patent as pertaining to matter not set out by respondents in their answer and to that portion relating to Exhibit Model Alsip & Drake patent, as not pertinent and incompetent.

By request of counsel for respondent and upon his statement that it is his intention to properly plead the Exhibit Voelk Patent, 231,512, counsel for complainant withdraws his objection thereto and to the testimony based thereon and consents for the purpose of simplifying this procedure, that such patent may be interlined into the present answer as if put therein when originally filed.

88 Cross-examination by E. W. BRADFORD:

X Q. 10. Please state the character of material which pulp machines are particularly designed to operate upon.

A. The material is of a diverse character, sometimes rags, sometimes straw, sometimes scrap paper, sometimes masses of partially reduced pulp stock, sometimes clay, and a great deal of it, the way they make paper nowadays, and sometimes wooden blocks to be reduced to pulp. In modern paper making, in which wood pulp is employed to a great extent, the wood is reduced, by various processes, to the state of pulp, which is then more or less dried and shipped in masses from the pulp mill to the paper mill. The paper mill puts these masses of wood pulp through a second reducing process to get it into the shape desired for the manufacture of paper, the same reducing machines being employed upon such clay masses as may be used in making the paper. In order that I may be clearly understood in opinions which I may have given, I deem it proper here to state that I have viewed instrumentalities rather than the material which they acted on. I have seen roller mills designed and constructed and used for operating on malt in a brewery, taken from the brewery and modified a trifle, and put into the bone mill for reducing bones to fertilizing powder. I have seen paint ground in a mill designed for and previously used for grinding coffee and spices. I have seen a reducing mill employed for making flour, taken from the flour mill and put into a foundry and employed for reducing and mixing anthracite coal, clay, soapstone and charcoal to produce a facing powder for the founder's molds. I have seen a machine designed for and used in breweries and distilleries for making compressed yeast, removed therefrom and taken to and used in a soap works on soap, and again removed and used in dealing with the clay used in the manufacture of fine encaustic tiling. Such things as this frequently come under my pro-
89 fessional notice. I have often advised the use of a machine for a purpose after seeing it used in some other art for another non-analogous purpose. Such change of purpose may, in many cases, very properly form the foundation for a process patent, but I do not understand that a machine patent can have any force whatever when it is merely based on the use of an old machine for a new purpose. Where a patent purports to be for a thing, my inquiries into such patent have always been, is this thing new; not, is this a new use of it; and not, is this a new material used in it; and not, is this a new product produced by it. Where the patent is a process patent, the case is of course different.

This is probably not competent testimony, but I make the statement as going to the reasons for opinions which I may have expressed, as I understand that an expert's reasons, in a patent litigation are of more importance, or of as much importance as the conclusions he may have reached through them.

Counsel for complainant objects to all of the foregoing answer after the word "pulp" in line five thereof, as totally irresponsive, impertinent and incompetent.

X Q. 11. Please state your understanding of the definition of the term cylinder.

A. A body having length and having circular cross-sections, and

having uniform diameter from end to end. This is the definition of the books. In practice in the mechanical arts, the term is applied to various revolving bodies having the general character of a cylinder, some of which will not respond at all to the book definition which I have given. In many reducing mills, the revolving body has the form of a cone or a frustrum and they are often spoken of as cylinders, and even in the books, referring to these so-called cutting cylinders, you will sometimes find such loose terms as "conical cylinder." The cylinder of a revolver may be truly cylindrical, but I have in mind a certaid four-barrelled revolver in which
90 the cylinder was nearer square than round, but it was always called a cylinder, and probably would be if it was three-cornered. The habit of the art has much to do with the use of such terms. There is in the market a steam engine known as Root's patent square cylinder steam engine. Briefly, the term cylinder, in the mechanic arts, is often loosely used as a term of designation rather than of description.

X Q. 12. In the matter of steam engines, revolvers and the like, the term cylinder is used as the commonly accepted name of a certain part of the device, rather than to define the form of such part, is it not?

A. Precisely so. Let me further instance the fact that in the reducing-mill art now under consideration, the cylinders are often called rollers, while they do not roll at all, they rotate. Sometimes the term "roll" is used, which would not be open to this criticism as the word does not necessarily imply a particular mode of motion.

JAMES W. SEE.

Respondent herewith offers in evidence the following letters patent to be marked respectively "Respondents Exhibit," with the name of the patentee as designating the exhibit in each case, viz:

No. 160,618, to Daniel Rudy, for clay-pulverizers, dated March 9th, 1875.

No. 242,387, to J. W. Smith, for apparatus for preparing wheat for grinding, dated May 31, 1881.

No. 110,927, to Isaac & Wm. D. Mayfield, for improvement in grinding mills, dated January 10th, 1871.

No. 92997, to Geo. H. Peabody, for cotton-seed huller, dated July 27, 1869.

No. 291,654, to Geo. Van Name, for roller for grinding mills, dated January 8th, 1884.

91 No. 53598, to Clinton T. Frost, for improvement in grinding cylinders of paper engines, dated April 3, 1866.

No. 225,976, to G. H. Ennis, for machine for preparing paper pulp, dated March 30, 1880.

No. 49714, to Robert Butterworth, for cider mill, dated September 5th, 1865.

English letters patent No. 1671, to Cook, Bombroffe and Baker, dated May 11, 1874, for improvement in clay mills, applicable also to the reduction of other substances.

No. 207,717, to Jonathan Creager, for wood-polishing machine, dated September 3, 1878.

No. 320,905, to Frank Alsip and Chester P. Drake, for clay-crushing machine, dated June 30, 1885.

No. 297,764, to John M. Case, assignor, &c., for feed-box for roller mills, dated April 29, 1884.

No. 52472, to T. J. Wells, for peat machine, dated February 6, 1866.

No. 116,029, to M. R. Fletcher, for pulp engines or crushers, dated June 20th, 1871.

No. 125,159, to Abram Alexander, assignor, &c., for machines for grinding clay, &c., dated April 2, 1872, and antedated March 26th, 1872.

No. 57280, to John Blackie, for machines for pressing tobacco, dated August 21, 1866.

No. 33119, to John R. Whittemore, for straw-cutters, dated August 20th, 1861.

No. 61932, to Warren Gale, straw-cutters, dated February 12th, 1867.

No. 231,512, to A. Voelk, for grinding mills, dated August 24th, 1880.

92 GEORGE HENRY STALLO, of lawful age, being first duly sworn, deposes and says in answer to questions propounded by respondent:

Q. 1. State your name, age, residence and occupation.

A. George Henry Stallo; forty-five years; 108 Broadway; partner in the Geiger Lumber Company.

Q. 2. Please examine model "Respondent's Exhibit Creager's Wood Polishing Machine," and state whether you ever saw a machine in operation constructed like it, where you saw it, and when?

A. I have seen the drum with the glass attachments, to the best of my knowledge, in the year 1881—I mean 1874.

Q. 3. Where did you see the drum, in whose shop was it?

A. I saw it in George Pelstring's, 35 and 37 Canal street, in this city.

Q. 4. Were you employed at that establishment, and how employed?

A. I was foreman there.

Q. 5. What did they do with that drum there?

A. We used it for polishing.

Q. 6. What sort of machine was it in; if you recollect, state how the other parts of the machine compared with this model?

A. The principal part of it that I have reference to is the drum. The only part that I do recollect is the self-feeder feeding from below, having fifty boards on a pile.

Q. 7. How did the machine containing this drum, and the drum, operate when polishing wood; was it successful or otherwise?

A. Well, it polished at least fifty boards, and there were two boards got under the glass and the pressure roller, and destroyed the roller. It polished the boards.

Q. 8. Did they repair the roller after that; and if not, why not?
A. They didn't have sufficient time to repair it. The factory burned shortly after that.

(Signed) GEO. H. STALLO.

93 ANDERSON EVANS, a witness of lawful age, being first duly sworn, deposes and says in answer to questions propounded by respondent:

Q. 1. State your name, age, residence and occupation.
A. Anderson Evans; sixty-nine; 109 Elm street, Cincinnati; machinist.

Q. 2. State whether you ever saw a machine for polishing boards that had been constructed by Jonathan Creager, and examine the model shown you, of Creager's wood polishing machine, and state how that machine compared with this model?

A. I did. It compared very favorably. The roller is of the same construction, that is, the polishing roll, and the frame was almost a sample or pattern of that construction. It was mostly of wood, the frame. The feed rolls were iron, turned up slightly. The polishing was done by glass being revolved over the surface of the board. I only saw a few boards polished before he put it in George Pelstring's factory. After it was put in Mr. Pelstring's factory I didn't see it working. I was there one afternoon, and he showed me the machine as it stood.

Q. 3. The essentials of the model consist of two pairs of iron feed rollers, and between these two pairs a drum with glass knives or plates inserted radially, and nearly underneath the drum a wooden roller to sustain the pressure of the boards while being acted upon by the drum. Did the machine that you say have these devices in that relation?

A. Yes, sir.

Q. 4. Did you at that time learn anything from Mr. Creager as to whether there was a patent upon that machine, or whether he made it in accordance with a patent of his?

A. He made it, as I learned from him, from his own invention.

Q. 5. Yes, but do you know whether he had a patent upon the invention at the time?

A. At the time I examined it I don't know whether he had a patent on it or not.

(Signed) A. EVANS.

94 JONATHAN CREAGER, a witness of lawful age, being first duly sworn, deposes and says in answer to questions propounded by respondent?

Q. 1. State your name, age, residence and occupation.
A. Jonathan Creager; seventy; Fairmount, Cincinnati; machinist, millwright; one of the defendants in this cause.

Q. 2. If you built any machine substantially corresponding with the model "Creager wood-polishing machine," describe it, state when you built it, whether it was used, and whether it was successful.

A. I built a machine exactly like the model in the summer of 1874, for the purpose of polishing cigar-box lumber. It was used. It was successful.

Q. 3. How long was it used, and why did they cease to use it, if they did?

A. We used it for a half an hour. We met with an accident. The machine was built to receive one board at a time, and by accident there was two boards got in the machine together, one on top of the other, and broke a number of the scrapers or polishers, they being made of glass, and before we could get others molded the building took fire and burnt down, and the machine was burnt up with it.

Q. 4. I observe that subsequently you took letters patent "Respondents' Exhibit Creager Patent" for this construction of machine, but you omitted the glass scrapers or polishers from the drum. What I want to know is, whether you considered that the patent covered that construction, whether they were mentioned or not?

A. I was fully under the impression that that device was covered by these letters patent.

Cross-examination by Mr. BRADFORD:

X Q. 5. Of what material was the cylinder of the machine
95 concerning which you have just testified, constructed? I mean the polishing cylinder?

Objected to as irrelevant and immaterial.

A. An iron spider with a wooden rim and the rim grooved out horizontally large enough to receive the scraper and a key.

X Q. 6. About how many glass scrapers did the polishing cylinder contain?

A. The cylinder was twenty inches in diameter, the polishers were placed about four inches apart, making about fifteen or sixteen polishers.

X Q. 7. Are you, or are you not, engaged in the manufacture and sale of machines for disintegrating clay?

A. I am.

X Q. 8. Do you consider that the machine you constructed in 1874 for polishing wood capable of performing the function of disintegrating clay?

A. I do.

X Q. 9. In the machines you manufacture for disintegrating clay, do you use a cylinder having longitudinal grooves with cutting bars or knives in said grooves and projecting beyond the surface of said cylinder, and coacting with a smooth-surfaced, oppositely set companion cylinder?

A. I use horizontal cutting bars, but I don't use a grooved cylinder.

X Q. 10. How are the bars secured in the cylinder?

A. The foundation is a cast-iron spider with closed ends whereon the knives are bolted firmly, and the circumference is afterwards closed with segments.

X Q. 11. Except for this modification in your cutting cylinder, do you use a construction set forth in question 9?

A. Yes, sir; I do.

X Q. 12. When did you first build a machine of such a construction designed particularly for disintegrating clay?

Objected to as irrelevant and immaterial.

96 A. I think it was in 1887.

X Q. 13. Prior to such time, had you ever seen a machine of such construction built by C. & A. Potts & Co., of Indianapolis, Indiana?

Same objection.

A. I never saw C. & A. Potts & Co.'s machine until 1889.

X Q. 14. Did you know of the existence of such a machine prior to the time when you built your first one?

Same objection.

A. I did.

X Q. 15. Had either yourself or the firm with which you were connected had anything to do with the Potts machine prior to 1887?

Same objection, and further, because it is too indefinite to be answered.

A. I know my youngest son bought their machine and sold it, but I do not know whether it was prior to 1887 or not.

X Q. 16. Was it prior to the time when you built your first machine like it?

Objected to as before, and further, in misrepresenting the testimony of the witness, there being no testimony of this witness that he ever built a machine like the Potts machine.

A. It was prior.

X Q. 17. In what way, if at all, did the machine you built differ from the Potts machine?

A. I can't tell, for the reason that I don't know exactly how a Potts machine is built.

X Q. 18. Did you know at the time you commenced building your machines, that the Potts Co. had patents on their machines?

A. I was under that impression.

X Q. 19. Did you know, or not, that the machines you were building were infringements upon their patents?

A. I knew they claimed that I was infringing.

JONATHAN CREAGER.

97 Circuit Court of the United States in and for the Southern District of Ohio.

C. & A. POTTS & Co.)
vs.
FRANK F. CREAGER *et al.*)

UNITED STATES OF AMERICA,)
Southern District of Ohio, W. *D.*)

I, Buchanan Perin, a notary public within and for Hamilton county, in the State of Ohio, district aforesaid, do hereby certify that the foregoing depositions of James W. See, George Henry Stallo, Anderson Evans, and Jonathan Creager, were taken pursuant to the notice hereto attached, at the offices of James Moore, in Pike's building, Cincinnati, Ohio; that said depositions were taken to be used on behalf of respondents in the above-entitled cause, on the fourth day of February, 1890, and duly continued until the fifth day of February, 1890; that there were present Mr. E. W. Bradford, on behalf of complainant, and Mr. James Moore, on behalf of respondents; that said witnesses were, each of them, before testifying, by me first duly sworn to speak the truth, the whole truth, and nothing but the truth; that said depositions were reduced to writing by me in the presence of said witnesses respectively, and by them respectively signed in my presence. And I further certify that I am neither attorney nor counsel for, nor in any way related to any of the parties in said cause, nor to any of the witnesses, and that I am in nowise interested in the result of said suit.

In testimony whereof, I have hereunto put my hand and affixed my notarial seal, this 5th day of February, A. D. 1890.

BUCHANAN PERIN,
Notary Public, Hamilton County, Ohio.

98 And afterwards, to wit, on the 5th day of May, A. D. 1890, the following deposition was filed in the clerk's office of said court, clothed in the words and figures following, to wit:

Complainant's Deposition.

Circuit Court of the United States for the Southern District of Ohio, W. D.

C. AND A. POTTS AND CO.)
vs.) No. 4244. In Equity.
FRANK F. CREAGER *et al.*)

The defendant will take notice that the complainant will examine T. E. Chandler, A. Potts, S. K. Fletcher, George Potts and J. W. Billingsley, of Indianapolis, Ind., and O. W. Bond, of Chicago, Ill., as witnesses on its behalf, in the above-entitled cause, under the sixty-seventh rule in equity, as amended, before Harold Taylor, Esq., notary public, at the office of C. & E. W. Bradford, in the city

of Indianapolis, county of Marion and State of Indiana, on Monday, the 10th day of March, A. D. 1890, commencing at 2 o'clock in the afternoon of said day and continuing from day to day until said examination is completed.

C. & E. W. BRADFORD,
Solicitors for Complainant.

Indianapolis, March 1st, 1890.

Service and receipt of copy of above notice acknowledged at Cincinnati, Ohio, this 3d day of March, 1890.

SAMES MOORE.
Solicitor for Defendants.

99 Circuit Court of the United States for the Southern District of Ohio, W. D.

C. AND A. POTTS AND CO. *vs.* FRANK CREAGER *et al.* } No. 4244.

Rebuttal testimony taken on behalf of complainant in the above-entitled cause pursuant to notice to defendants hereto annexed before Harold Taylor, Esq., notary public, at the office of C. & E. W. Bradford, in the city of Indianapolis, Indiana, commencing at 2 o'clock in the afternoon of the 10th day of March, 1890.

Present: Mr. E. W. Bradford, on behalf of complainant; Mr. James Moore, on behalf of defendants.

GEORGE POTTS, being duly called as a witness on behalf of complainant, and first duly sworn, in answer to interrogatories propounded by E. W. BRADFORD, deposes and says as follows, to wit:

Question 1. State you name, age, residence and occupation.

Answer. George Potts; Indianapolis, Indiana; machinist; age, 53 years.

Q. 2. Where are you employed at present and in what capacity?

A. With C. and A. Potts & Co., superintendent.

Q. 3. What is the nature of the business of the C. & A. Potts Company?

100 A. Manufacturing clay-working machinery.

Q. 4. How long have you been engaged in the manufacture of clay-working machinery?

A. Nineteen years.

Q. 5. Do you know anything about the practical use and operation of clay-working machinery?

A. Yes.

Q. 6. Please state the extent of your experience in such matters.

A. I have been engaged in the manufacture of clay-working machinery, as well as setting up and using, for nineteen years.

Q. 7. Do you know anything about the machine known as the

Potts clay-disintegrator for which letters patent of the the United States No. 322,399 and No. 368,898 were issued to C. & A. Potts?

A. Yes.

Q. 8. What experience have you had with this machine?

A. I have set up and handled the disintegrators, and they gave very good satisfaction. I know that they have proven to do their work well, leaving the clay in a condition that it absorbs water and tempers easily.

Q. 9. Have you had anything to do with the manufacture of this machinery?

A. Yes, sir. Superintending the manufacture and construction of them.

Q. 10. Do you know anything concerning the inventing of it, and if so what?

A. Being superintendent of the works I had the work done, and was by when the machines were tested.

101 Q. 11. Have you ever seen the machine in actual use, and if so to what extent?

A. I have seen them in actual use, numbers of them—300 or 400, I suppose, or more, that I have set up and started myself.

Q. 12. What is the character of work which this machine was particularly designed to perform in the process of manufacturing clay products?

A. It disintegrates or pulverizes clay, preparing it for the pug mill.

Q. 13. Prior to the introduction of this machine, what character of machinery had generally been used to do this work, if any?

A. Roller crushers.

Q. 14. How does the operation of the Potts clay disintegrator differ from that of the roller crushers in result achieved, if at all?

A. The roller crushers leaves the clay in sheets and in a compact solid form that will not absorb water readily. The disintegrator pulverizes and leaves the clay in a loose condition, absorbing the water rapidly.

Q. 15. Were you familiar with clay manufacture generally, and the machines used therein, prior to the production of this invention?

A. Yes, sir.

Q. 16. Were you familiar with any machinery prior to the Potts invention capable, in your opinion, of performing the work and achieving the result of said invention?

A. No, sir.

Q. 17. As an experienced clay-worker how did you re-
102 gard the Potts invention when you first saw it and witnessed its work?

A. As a valuable improvement in the working of clay—as in the pulverizing of clay.

Q. 18. Do you know whether or not this machine went into public use readily, and if so, to what extent?

A. Well, we had some trouble in introducing them at first, being

entirely new. Clay-working men, not understanding the principles of it, had to be convinced by using of its practical value.

Q. 10. Were you successful in convincing them of its practical value or not?

A. After using the machines they universally acknowledged their superiority over crushing rollers.

Q. 20. Please state as fully as you can the defects or objections in the old crushing rollers and the old method of producing clay which were overcome and remedied by the production of the Potts clay-disintegrator?

A. My first experience with crushing rollers was with the manufacture of drain tiles. In manufacturing tile we experienced the trouble with clods and stones lodging and obstructing our dies. To overcome that trouble crushing rolls were invented. Then we found it difficult to temper our clay, that the clay would not absorb the water after passing through the rolls. Also a very serious objection that it made our tile machinery run heavy, causing breaks, and on account of the clay being rolled into a solid mass. Then, again, the tile was defective owing to laminations caused by passing through the rolls. The disintegrator overcomes these difficulties entirely.

103 Q. 21. Please describe fully how and why the disintegrator overcomes the difficulties you have mentioned.

A. It leaves the clay in a soft, pliable condition so that when forming in the moulds it leaves a solid mass of clay, and in drying and burning it will shrink evenly without checking.

Q. 22. Please examine the model of the Alsip & Drake patent, defendant's exhibit, and state why, in your opinion, the machine there shown would not accomplish the same result.

Question objected to as leading as the witness has not been asked nor is there any testimony in the *the* record that it won't accomplish that result.

A. Being two smooth rollers it would cause lamination of the clay.

Q. 23. How does it differ from the old machines you have termed roller crushers, if at all?

A. Not any in the result from the old machine.

Q. 24. I ask you to examine defendant's exhibit—Creager's wood-polishing machine. State if you understand its construction and if the machine there shown would, in your opinion, accomplish the same result in clay working as does the Potts clay-disintegrator.

A. Well, yes; I don't think it would be possible to get clay through the machine.

Q. 25. What do you mean by yes?

A. That I understand the construction of the machine.

Q. 26. And what in your answer to the last part of question 24?

104 A. No, I don't think it would.

Q. 27. Would what?

A. I don't think it would work the clay as our machine would.

Q. 28. And why would it not?

A. For the simple reason that you couldn't get the clay through it.

Q. 29. I ask you to examine the model, defendants' exhibit model of figure 262 on page 89 of Knight's New Mechanical Dictionary, and state if you understand the construction of the machine there illustrated.

A. I think I do.

Q. 30. Please state whether or not, in your opinion, a machine of the construction shown in said model would accomplish the same result in clay working as does the Potts' clay-disintegrator?

A. A machine constructed with the cylinder and bars so close couldn't possibly take the clay through. The clay would fill the spaces between the bars making a smooth surface, consequently it wouldn't take the clay through unless sheeting it and causing laminations the same as the roller crushers.

Q. 31. Please state whether or not the feed-roll in said model would operate the same as that of the Potts clay-disintegrator, and if not, why not?

A. Being corrugated, leaving spaces that stone or clods would pass through without being crushed.

Q. 32. To what extent has the Potts clay-disintegrator gone into use?

A. I can't tell exactly, but they have gone—well, there are over a thousand of them in use anyway.

105 Q. 33. How long have they been on the market?

A. About six years.

Q. 34. Do you know whether or not they have taken the place of other machinery in any instances?

A. I do. They have in many instances replaced other machinery.

Q. 35. What kind of machinery have they replaced?

A. Roller crushers.

Cross-examination.

Questions by Mr. MOORE:

X Q. 36. In a preceding answer you describe an experience of yours in tile-making; please state when that was.

A. Well, I owned and operated a tile factory for two years. It is four years since I sold it—about four years.

X Q. 37. Was this before the corporation of C. & A. Potts & Co. was organized?

A. It was during the time that that was organized.

X Q. 38. You say during the period that you manufactured tiles you introduced or invented the use of crushing rollers for clay?

A. No, sir.

X Q. 39. Am I right about that?

A. The crushing rolls were not invented while I was manufacting tile.

X Q. 40. When did you first know of the use of crushing rolls for pulverizing or crushing clay as a step in brick-making?

106 A. It is about eighteen years since we first used them for manufacturing tile. Then they were gradually brought into brick-making, too.

X Q. 41. Those crushing rollers were plain cylindrical rollers, were they not, and operated in pairs?

A. Yes, sir.

X Q. 42. In your reference to the Alsip and Drake model, I understand you to say it is composed of two plain rollers. Do you mean that the top roller upon which I place my finger is a plain roller?

A. No. I meant that the clay in passing through the roll is the same as passing through an ordinary two-roll crusher.

X Q. 43. Did C. and A. Potts & Co. manufacture disintegrators like that shown in patent No. 322,393, and about how many did they make of that kind?

A. They did, but I couldn't tell the exact number; they made quite a number of them.

X Q. 44. Can't — state a little more accurately than that about how many they made and when they made them?

A. Well, not exactly; in the years of '84 and '85 I think they put out some fifty of them at least.

X Q. 45. When did they commence to make the disintegrator shown in patent 368,898?

A. I think in 1886.

X Q. 46. When I asked the last question you examined the date of the patent, did you not, as you held it in your hand?

A. No. Those dates I can get from the time I was *was*
107 working in the factory up there; I know I tried the first one that was built; the first one that they built was tested there.

X Q. 47. But have you an independent recollection of that date, independently of the patent lying before you?

A. My books would show the date exactly.

X Q. 48. That is *is* not the question I asked you. I asked you do you now recollect, without reference to your books or the patent, when you made the first roller disintegrator?

A. I do.

X Q. 49. State the date.

A. Well, now, maybe—I wouldn't attempt to state positively without reference to my books; it is a pretty hard matter to remember dates as to the day or month. I can produce my books, which would give the date correct.

X Q. 50. How long was it after you made the first disintegrator with a single roll and abutment, as shown in patent 322,393, before you made the first double-roll disintegrator?

A. A double-roll disintegrator followed the same season as we made the single roll, it might not have been just exactly, that is, the month; but it wasn't a year I know.

X Q. 51. When was the corporation of C. & A. Potts & Co. organized?

A. I don't know exactly whether it was '85 or '86.

X Q. 52. Had the disintegrators of either class been made before the organization of the corporation?

A. Yes, sir.

108 X Q. 53. Had the disintegrators of both classes been made before the organization of the corporation?

A. I couldn't positively state as to that.

X Q. 54. What is the present state of your memory without reference to your books as to which was the earlier in point of time, the manufacture of the double-roller disintegrator or the organization of the corporation?

Counsel for complainant object to the questions 43 to 54 inclusive of the foregoing examination as immaterial and not cross-examination.

A. Well, I wouldn't like to be positive in regard to that. I would rather refer to the books as it is an easier matter, and then be positive about it.

X Q. 55. To what books do you refer?

A. The shop books, the company's books.

X Q. 56. How long would it take you to get this shop book?

A. An hour.

X Q. 57. You say that about 18 or 19 years ago crushing rolls were first used, so far as you know for disintergrating clay. Prior to that time what was used, if you know?

A. The crushing rolls don't disintegrate clay they make it compact and harder to temper than before it is passed through them. Prior to the use of rolls they used the tempering wheel, or the "mud wheel" some call them.

X Q. 58. Well, did the mud wheel disintegrate the clay?

A. To some extent.

109 X Q. 59. Did it do it better than the crushing rolls?

A. Yes, sir. With the exception of not getting rid of the stones.

X Q. 60. The difference between the crushing rolls and the rolls shown in the latest Potts patent 368,898, is that the one cuts and the other does not, is that correct?

A. You can't say that the disintegrator cuts, it does its work by a blow, a crushing blow.

X Q. 61. Then please tell me why the top rolls shown in the Alsip & Drake model would not give that crushing blow?

A. The teeth being so close, the speed required to get the crushing blow would be so high—the spaces being so close—that it would not be able to catch it; to give it the crushing blow.

— Q. 62. You testified heretofore that neither of the three models before you would disintegrate clay; how do you know that, did you try these models upon clay?

A. No, I didn't try them, but my experience has been that you could not get the clay through them, in the shape that they are, to disintegrate the clay.

X Q. 63. Suppose that hoppers were put upon the models of the Creager machine and Alsip & Drake, I ask you then whether they

both would not disintegrate clay in the same manner as the Potts machine?

Counsel for complainant objects to the foregoing question as calling witness' attention to a machine not shown to be in existence.

A. No, sir; the clay would not feed through them.

X Q. 64. Why?

A. It would choke and stick to the hopper.

110 X Q. 65. Suppose these models were made five times their present size, each with an opening between the rolls five times what is shown in the model, would they *they* then choke or would they disintegrate the clay?

Counsel for complainant objects to the foregoing question as calling witness' attention to a machine not shown to be in existence.

A. They probably would disintegrate dry clay, but not in a sticky or plastic condition.

X Q. 66. Why?

A. For the simple reason that the clay wouldn't feed through.

X Q. 67. Confining your attention for the purpose of this question to one of the models, say the Creager wood-polishing machine, and assuming that the size stated in the preceding question is maintained, please state why damp clay would not feed through such model?

A. Clay is of a sticky nature, and requires to be forced up against the rolls to make it feed.

X Q. 68. I don't understand what there is in the Potts machine to push the clay against the rolls that is not, or the equivalent of it, found in the Creager model. Will you please explain that matter?

A. That's supposed to run in that direction. It would compact the clay on the apron, and gradually fill up and form an arch over the cylinder preventing all possibility of the clay feeding.

X Q. 69. View that comparison in another way; assume the two Creager rollers that are now placed vertically one to the other to be placed horizontally, as shown in the Potts model, with an

111 appropriate hopper over them, would the Creager model then disintegrate clay, and would it disintegrate damp clay.

Counsel for complainant objects to the foregoing question as assuming the destruction of one machine of a doubtful character for the purpose for which it was designed, and the construction of another machine purely visionary.

A. My experience has been that damp clay cannot be fed through a disintegrator unless some force feed is applied.

X Q. 70. Well, if the Creager model were placed with its rolls as aforestated, horizontally to each other and had force feed, would it then disintegrate dry and damp clay?

Objected to by counsel for complainant for the reasons above given and also as incompetent and immaterial.

A. That would depend entirely upon how it was constructed.

X Q. 71. Well, constructed as stated, two rolls horizontal to each other, their general bearings upon the same horizontal plane, each operated by a force feed, I ask you, would or would it not then disintegrate clay, wet or dry?

Same objection.

A. That depends altogether upon how it was constructed. There are a number of different feeds and it would depend altogether upon what kind of a feed was used and how it was arranged. If you make a Potts machine out of it it will work. Beyond that any experiment that they might make or that I might make
112 might be a failure, but that, if they construct it as the Potts machine, I am confident it will work.

X Q. 72. You mean by constructing it like a Potts machine, so constructing it properly and in a workmanlike manner, do you not?

A. I meant if they constructed it as a Potts machine which, we claim in our patent, it would work.

X Q. 73. Well, but more particularly, Mr. Potts, you mean that if it was properly constructed so as to work it would then be constructed like the Potts patent machine, do you not?

A. I would like you to make that a little more definite. I don't understand what you are driving at. I can't answer anything I don't understand.

X Q. 74. Who first suggested to you that a knife or breaker, or whatever you call it, put in a periphery of a roll would improve the operation of a crushing roll?

Counsel for complainant objects to the foregoing question as incompetent, witness not having claimed the invention as his own and not being competent to locate the invention of others.

A. Well, there were so many experiments made at different times at the shops that I don't hardly like to answer that.

X Q. 75. Was your concern a company engaged in making these disintegrators before it was incorporated?

Objected to as immaterial.

A. I don't understand that; you will have to make it a little plainer.

— Q. 76. Did you incorporate before you commenced to
113 make disintegrators, or did you make disintegrators before you incorporated?

Same objection.

A. Well, I don't know; I couldn't answer that. The books will show that.

X Q. 77. How long have you been superintendent of the present company?

A. About two years.

X Q. 78. Who was superintendent of C. & A. Potts before you?

A. That question I refer to the books.

X Q. 79. Were you superintendent when either of the inventions or when both of the inventions shown in the Potts patent in suit were made?

A. I think I was when the first one was made, but I wouldn't be certain as to that; but the books will show.

X Q. 80. In direct examination your doubts were not so prominent; when you were asked in question 10 what you knew of the invention, you said you were superintendent and had the work done and tested it when the invention was made. Why ain't you equally frank in answering my question?

A. I am positive I was superintendent when the first one was got up, and tested the machine.

X Q. 81. You said a few minutes ago that you would bring the books that you referred to here, or that you could bring them within an hour; I ask you now will you bring them at any time during this session?

A. I would be glad to do so if it were not that I was leav-
114 ing the city on urgent business, and won't have time to bring them. If you had insisted on it or asked for them when you first spoke of it, I could have sent for them and had them here before this time. But they can be examined at any time.

X Q. 82. You did not state then or intimate that you were going to be absent and counsel examining you simply postponed the request for your convenience until such a time as you would be going away, or as he would be through with you upon other matters, and I now ask the witness or counsel here present if you will now agree to produce these books for the examination of counsel or while some of complainant's witnesses are upon the stand that are familiar with the books.

Counsel for complainants notifies counsel for defendants that he knows nothing of the contents of the books referred to and will enter into no agreement at this time to produce them; also that complainants cannot agree to produce evidence on behalf of defendants herein or encumber their record with testimony in evidence which defendants should have had in their own record had they wished to use it; he also objects to all the foregoing testimony relating to the matter of these dates for the above reasons and gives notice that he will move to strike it out.

X Q. 83. After the double-roller disintegrator was introduced how many per annum of them did you make for the first four years?

A. That's a question that can't be expected for me to answer
115 exactly. I suppose the first four years we sold upwards of a thousand. Well, the first year we didn't sell so many, but the business has been increasing each year and is still increasing; we are selling more this year than ever before; that is a question which it is hard to answer accurately.

GEORGE POTTS.

STEPHEN K. FLETCHER, be- called as a witness on behalf of complainant herein, being first duly sworn, in answer to interrogatories proposed by E. W. BRADFORD, deposes and says as follows, to wit:

Question 1. Please state your name, residence and occupation?

Answer. S. K. Fletcher; Indianapolis; brick maker and manufacturer.

Q. 2. How long have you been in the brick-making business?

A. About twenty years.

Q. 3. Are you familiar with clay-working machinery generally?

A. Yes, generally.

Q. 4. Do you know anything concerning a machine known as the Potts clay-disintegrator, shown in the patents 322,393 and 368,898 for C. & A. Potts?

A. I know somewhat in regard to it.

Q. 5. Please state its functions and the step in clay-working it is designed to perform.

Objected to as incompetent; the patent shows that.

A. It is intended to disintegrated or pulverize tenacious clays, to better enable them to take water and temper it.

116 Q. 6. Please state your opinion of the manner in which the machine does this work.

A. It performs its work perfectly in all clays suited to be handled with that class of machine.

Q. 7. How long have you known of the existence of the Potts machine?

A. Since it has been built. I can't state the time.

Q. 8. In the art of clay-working what had been used prior to the Potts invention for preparing the clay for tempering?

A. Machines for preparing the clay in this way where crushing was necessary was only done by rollers, so far as I know.

Q. 9. Please state your opinion of the relative merit of the roller crushers and the Potts disintegrator?

A. The Potts disintegrator does the work in a far better manner than it is possible for roller crushers with a large majority of clays adapted for making brick.

Q. 10. Please state the reasons for this.

A. In all ordinary brick clay the roll crushers simply mash it into sheet form, leaving it fully as hard to take water as it was in its natural state. The disintegrator tears the clay or pulverizes it, leaving it in a condition to perfectly temper after absorbing the water.

Q. 11. Why were the roll crushers used at all?

A. I presume that was as far as they had got with any invention for the purpose. The roll crushers are better adapted for some work, or some kinds of clay than a disintegrator.

Q. 12. When the Potts machine was first put upon the market did you become acquainted with it?

A. Yes.

117 Q. 13. How did you regard it at that time?

A. I felt that it was a great step in the way of an improvement to perform the work which had not been thoroughly done before.

Q. 14. Had you before this time known of the existence of roll crushing and grinding machines, such as roller mills, pulp engines, apple-grinders and the like?

A. I have never given the matter in this respect any attention whatever.

Q. 15. I mean had you known of the existence of such machines independent of the question of clay-working or its connection therein, as a general matter of information?

A. I knew of the existence of apple-grinders, cider mills they called them. In fact, I have used them very often. There was no other character of mill that I was at all acquainted with of those you named.

Q. 16. What kind of a machine do you use yourself for disintegrating clay?

A. I do not use any. Our clay does not require it.

Q. 17. Do you know of your own knowledge as to the regard for the Potts clay-disintegrator by the trade generally?

Objected to as incompetent, irrelevant and hearsay.

A. Well, I can speak more particularly of those that I have sold in connection with the brick-making machinery which I handle. In those cases it has worked perfectly.

Q. 18. Did you ever sell any other disintegrator than the Potts?

118 A. I have.

Q. 19. What were they?

A. I have sold quite a number of the Jonathan Creager disintegrator of Cincinnati.

S. K. FLETCHER.

Whereupon the further taking of this testimony was adjourned until tomorrow, Tuesday, March 11, 1890, at 9:30 o'clock a. m.

TUESDAY, *March* 11, 1890—9:30 o'clock a. m.

The parties met pursuant to adjournment.

Present: The same as on yesterday.

The taking of the testimony was resumed as follows:

THOMAS E. CHANDLER, a witness of lawful age, being called as a witness on behalf of complainant, and being first duly sworn, in answer to interrogatories proposed by Mr. E. W. BRADFORD, deposes and says as follows, to wit:

Question 1. State your name, residence and occupation.

Answer. Thomas E. Chandler; residence, Indianapolis; manufacturing machinery.

Q. 2. How long have you been in the business of the manufacture of machinery?

A. About thirty years.

Q. 3. Are you familiar with the manufacture, use or operation of that class of machinery known as clay-working machinery?

A. I have had some experience in that line.

119 Q. 4. Please state if you know anything of the practical use and operation of that particular clay-working machine known as the Potts clay-disintegrator, as illustrated in letters patent of the United States No. 368,898 and 322,393, to C. and A. Potts.

A. I have seen the machine in operation and I am somewhat familiar with its mode of operation.

Q. 5. Please state more fully the extent of your experience in the art of working clays and the machines used for this purpose.

A. We manufactured machinery for making drain tile for fifteen or twenty years, which included crushers for crushing the clay.

Q. 6. Please state your understanding of the use and operation and purpose of the Potts clay-disintegrator.

A. Well, as I understand it, it is for the preparation of clay—to put it into good condition for being moulded into shapes.

Q. 7. Is the step known as tempering done before or after the operation of the disintegrator upon it?

A. I don't think there is any universal custom as to that. I think there are some tempered beforehand and some after passing through. I think where clay is crushed between rollers that it is preferable to temper afterwards.

Q. 8. What machine or class of machinery had been used for the same purpose as that for which the Potts clay-disintegrator was designed prior to the Potts invention so far as you know?

A. Crushing rollers, so far as my knowledge goes. The clay was passed between them.

120 Q. 9. How does the operation and result of the Potts clay-disintegrator differ from the operation and result of the crushing rollers?

A. Well, they are entirely different. Crushing between rollers puts the clay in a flaky condition, making a continuous cake of it so compact that it is difficult to get the water through it and makes it hard to put through a die into any other shape from the fact that the sides of it do not adhere to each other very readily. On the other hand, the Potts machine tears the clay into fragments, leaving it in good condition to take the moisture or to mould it into regular or irregular shapes.

Q. 10. In what way does the clay product when produced differ if made from clay prepared by the roller-crusher process from the product prepared by the Potts disintegrator process?

A. Clay that has been passed between rollers, at least some kinds of clay, is liable to show laminations in the product unless it is subject to be tempered after being passed through the rolls. I don't think that would be the case with any kind of clay as treated by the Potts machine.

Q. 11. How long have you been acquainted with the Potts machine?

A. I am not able to fix the time. I think I saw the first machine they had made.

Q. 12. What was your opinion of the value of the invention when you first saw it?

A. Well, I thought it was a step greatly in advance of anything that had ever been done before.

Q. 13. Prior to this time had you been familiar in a gen-
121 eral way with roller-crushing and grinding machines, such as apple-grinders, pulp engines, grain-reducing machines, and the like?

A. I was somewhat familiar with those things, but more from observation than experience of it, although I had some experience in crushing clay. I think I might say that all the experience and observation in working clay was not dry clay, but tough, tenacious clay, when moist.

Q. 14. Notwithstanding your knowledge of the existence of such machines as mentioned in the foregoing question, when you saw the Potts invention you regarded it as a "a step greatly in advance of anything that ever had been done before," did you?

Objected to as leading.

A. I did.

Q. 15. I ask you to examine the model before you marked Defendant's Exhibit Model of Figure 262 on page 89 of Knight's New Mechanical Dictionary in connection with a copy of said figure and the accompanying description, which I now hand you and state if you understand the construction of the machine there illustrated?

A. I believe I understand the construction of it as shown by the model. There are some lines on the drawing that don't seem to be shown in the model, nor their use, as they are not marked in the drawing, and I take it for granted they are not important to the operation of the machine.

Q. 15. What lines do you refer to; what do they appear to repre-
sent?

122 A. As shown in the drawing it looks as though it might be a shield covering the fluted roller, and also a part of the large grating roller.

Q. 17. Please state your opinion as whether or not this machine would be able to take the place of the Potts clay-disintegrator in the art of clay-working, or would be capable of accomplishing the same result, and if not why not?

A. I don't think it would produce the same result as the Potts machine, because the spaces between the bars would fill with clay so compactly as to be discharged with difficulty, and the fluted roll would simply become a round roll covered with clay.

Q. 18. With a machine in such condition what would be its action on the clay, if any?

A. I don't think it would have any action upon the clay.

Q. 19. I show you copy of the drawing marked Respondents Extract from Knight's Dictionary No. 1, containing a copy of figure 6864 thereof, with an accompanying description, and ask you to ex-

amine the same, and state if you understand the construction and operation of the machine there illustrated.

A. I believe I do.

Q. 20. Please state your opinion of whether or not the machine there shown could be used successfully in disintegrating clay, and whether or not it is capable of accomplishing the same work and result as the Potts clay-disintegrator?

Objected to as immaterial.

A. I don't think it could be successfully used for that purpose.

123 Q. 21. And why not?

A. I think the spaces between the bars would fill probably with clay, and the groove roller would become a round smooth roller.

Q. 22. I ask you to examine the model before marked Respondent's Exhibit Creager's Wood Polishing machine, and state whether or not you find therein a machine, capable of performing the work of the Potts invention.

A. I don't think that that would disintegrate clay in its present condition.

Q. 23. Please state the character of the machine which said model illustrates and why it would not disintegrate clay.

A. The roller underneath the barred cylinder is a dead roller, no means of giving it motion, nothing to feed the clay into the machine; that roller being a dead roller would simply clog up and remain stationary.

Q. 24. In what relation to each other do you find the barred cylinder and the companion cylinder?

A. There are five cylinders in the machine, only one of which comes in contact or near approach to the barred cylinder and that is the dead cylinder that I referred to before, which is beneath the barred cylinder.

Q. 25. Could the clay be fed through between cylinders in this relation to each other at all; I mean by that in a manner at all practical for every-day use?

A. Why, I don't see how it could be used for disintegration of clay at all in its present condition. I think not.

Q. 26. Does the smooth roll beneath the barred cylinder directly coact with the barred cylinder?

124 A. I think it does not.

Q. 27. Is or is not the setting of the barred and smooth rolls into close relation with each other so that the bars will coact upon the surface of the smooth roll an important feature in the Potts invention?

Objected to as incompetent, as it is for the patent to tell that story.

A. I think it is.

Q. 28. What would be the result of the operation of the Potts machine, do you think, if the rolls were set a sufficient distance apart to feed boards between them?

A. Clay would not be thoroughly disintegrated, although some of the lumps might be crushed or partially disintegrated.

Q. 29. Would the usefulness and value of the machine for the purpose for which it was designed be destroyed or injured?

A. I think it would be injured.

Q. 30. Suppose the rolls of the Creager wood-polishing machine were in a horizontal relation to each other instead of vertical and as close together as are the rolls in the Potts clay-disintegrator, would it be of any use or value in polishing boards?

Question objected to as irrelevant and immaterial.

A. Probably not.

Q. 31. I call your attention to the model before you marked Respondent's Exhibit Model of the Alsip & Drake Patent, and show you in connection therewith a copy of Defendant's Exhibit
125 Alsip & Drake's Patent, and ask you if in your opinion the machine there illustrated is capable of performing the work and result of the Potts clay-disintegrator, and if not, why not?

A. I don't think that it would accomplish the work of the Potts machine or leave the clay in the same condition. Clay in this machine is simply crushed between the two rollers revolving at the same speed and serrated roller above is simply a feeder to the crushing rolls.

Q. 32. I show you a copy of Defendant's Exhibit Butterworth Patent and ask you if you understand the construction of the machine illustrated in the drawing thereof?

A. I believe I understand it.

Q. 33. Please state whether or not in your opinion the machine illustrated in the Butterworth patent could perform the work of the Potts invention, and if not why not?

Objected to as indefinite; it not appearing which of the Potts inventions the witness's attention is directed to.

A. I think it would not perform the duties of the Potts machine, for the reason that it operates against a yielding surface.

Cross-examination.

Questions by Mr. MOORE:

X Q. 34. You say in answer to question 13 that you are familiar in a general way with roller-crushing and grinding machines, prior to the dates of the Potts invention, such as apple-grinders, pulp engines, grain-reducing machines and the like; I want to know
126 whether the general familiarity had taught you the use of knives or beaters in the periphery of one or more crushing rolls?

A. Yes.

K Q. 35. In what machine did you know of the use of knives in the periphery of the roll?

A. In the rag engine.

X Q. 36. What was the use of the knife or knives in the periphery of the roll in the rag engine?

A. To shear the rags to pieces; to cut them to pieces.

X Q. 37. Did it strike you when you first saw a knife or beater in the periphery of the Potts roller that there was anything new in roller mills there?

A. I thought it was an entirely new device for the purpose.

X Q. 38. Do you mean that the device was new or the use of it was new?

A. I had never seen anything of the kind used for that purpose. The use of knives or beaters in the cylinder would not be new, but as adapted to that purpose and constructed in the Potts machine it was different from anything that I had ever seen used.

X Q. 39. If there was any novelty in the Potts machine apart from the use of knives to beat clay with, will you please state what it was?

A. Well, I looked more at the effect it had upon the clay than the machine itself. We were competitors in clay-working machinery, and I thought they had something so much superior to anything that we had, or so far as I knew, any one else had, that it would supersede the use of crushing rolls entirely, and it
127 did not occur to me that the device was an old one that we could use or that any one else could use, because we regarded it as the Potts invention, and that they were entitled to whatever benefits there were in its manufacture and use.

X Q. 40. But you do not appear to have touched the pith of the question, which I will try to restate, thus: Was there any novelty in the Potts machine as compared with the prior art, other than the use of knives or beaters in the periphery of the roll?

A. Well, I don't know. There was in the product, but I don't know whether there was in the machine or not.

X Q. 41. Isn't it the fact that whatever of merit or of utility the Potts machine had apart from merely good workmanship arose from the use of the old and well-known knives in the periphery of one of the rolls, between which the clay was to pass?

A. I believe so.

X Q. 42. I want to again call your attention to the model of the Creager polishing machine. I have understood you to say of your opinion that if the polishing roll there shown was placed so that its journals and the journals of the roller underneath were upon the same horizontal plane, that then it would not operate to disintegrate clay, because the plane roller is a dead roller, that is, has no positive movement. I wish you to assume, in accordance with the fact, that the model herein in that particular does not represent the machine actually used, but that there was a system of gearing, as shown in the Creager patent, whereby the rolls were operated posi-
128 tive, and I ask you if that change assumed whether the model, with an appropriate hopper added would not have substantially the operation of the Potts disintegrator?

Counsel for complainant objects to this question because it assumes

the destruction of the machine for the purpose for which it is designed and the construction by the use of its parts and several other parts not found therein of an imaginary machine not shown to ever have existed, but as near the construction of the Potts machine, as shown in the Potts patent, as counsel can state; and further, because it assumes an erroneous construction of the machine shown in the Creager patent, in that the rolls shown in said patent, which correspond to the dead roll of the model also appear to be dead rolls connected with no gearing whatever; and further, because the question and the evidence sought to be obtained is incompetent and immaterial.

A. That statement that I made in response to Mr. Bradford's question was not what I think I said, nor do I think that that was Mr. Bradford's question; he asked me if the rolls were placed in a horizontal position to each other whether that would destroy the machine as a wood-polishing machine; I did state, however that the Creager wood-polishing machine, in my opinion, was not adapted to the disintegration of clay in its present condition. I think it might be modified and reconstructed with hopper and live rollers so as to convert it into a machine for disintegrating clay similar in its operation to the Potts machine.

129 X Q. 43. Would any modification be required other than to take the two crushing rolls out from a previously used machine and insert therein with the same gearing the Creager polishing roll and plain roll?

Objection repeated.

A. Well, if these were put in their places and in the proper relative position to each other with their proper relative speeds the operation would be the same.

X Q. 44. I direct your attention to the Alsip & Drake model, the upper roller you have stated is merely for the purpose of feeding the clay to the plain rollers beneath; the upper roller is called in the patent that that model is intended to illustrate a muller, what do you understand a muller to mean?

A. I don't know.

X Q. 45. I will read from the specification of the Alsip & Drake patent as follows: "Said muller H is grooved in the manner shown to form teeth or sharp-pointed corrugations *h* 3, which serve by the weight of said muller to cut or crush the lumps of clay, as the same are fed in the hopper J, preparatory to passing between the rollers C D." I want to ask you whether your judgment of the use of that muller wouldn't be modified by the language of the patent just quoted?

A. No, sir; I think not. I stated that it acted as a feeder to the other roll, and in the nature of things its weight would crush the lumps and prepare them for feeding the other roll, the fact of the feed being out of here, in my opinion, wouldn't give it any value as a feeder or a grinder.

130 X Q. 46. Suppose a mechanic skilled in the art of making disintegrators for clay-grinding had not seen a knife or beater

placed in the periphery of rollers for that purpose, but was familiar with the use of knives or beaters in the peripheries of rollers for analogous purposes, as shown by the prior art, wouldn't his knowledge of the business or trade enable him to fix with reasonable certainty the distance apart that the knives should be in the periphery of the grinding roller to produce good results?

Counsel for complainant objects to this question because it has not been shown that disintegrators for clay-working were ever made prior to the Potts invention, and, therefore, that mechanics could not have been familiar with the art of making such machines prior to the date of these patents or until the production of the Potts inventions had schooled them in this art; the question, therefore, assumes an impossibility, if the evidence is to be competent, and if counsel refers to the familiarity of mechanics with this art since the production of the Potts invention then the question is objected to as incompetent.

Counsel for respondent desires to say that he is deeply grateful to complainant's counsel for his voluntary effort to take the place of the witness, and thinks he understands the impatience of counsel and fear lest the witness should understand the question in an impartial way, but thinks nevertheless that it would be appro-
131 priate to reserve such speeches until the trial of the cause, otherwise, if he cannot restrain until that time, that he be sworn as a witness in the cause.

Counsel for complainant answers counsel for respondent, that he has made no attempt to take the place of the witness, nor shown the least impatience, alleged by the counsel for respondents; that he must be his own judge of what it is appropriate for him to say upon the record, and what reserve until the hearing of the cause; that he believes the objection made to question 46 is plain, and not capable of the understanding which counsel for respondents would endeavor to make appear.

A. Not so well as after he had seen somebody else do it; mechanics make mistakes; the inventor of this Alsip & Drake machine probably had some experience in working clay; he places a roller with corrugations or knives upon it above two smooth rollers for the purpose of feeding the clay into those rollers, and has without doubt found by experience that the knives or blades gave it no value for that purpose. If Potts had attempted a machine with blades close together it would have been a failure no doubt; these ideas do not always come to inventors; perhaps they use their best judgment, but from lack of previous knowledge or experiment are unable to reach the best results. While mechanics may have been familiar with cylinders having inserted blades in the periphery used for various purposes it may not have occurred to them that they could be utilized for the disintegration of clay until after he
132 had seen the operation of such a machine. The Creager wood-polishing machine here exhibited has a cylinder with blades in its periphery similar to those used in the Potts machine, but it probably did not occur to Mr. Creager, although he was the

manufacturer of clay-working machinery, that that kind of a cylinder could be used for disintegrating clay until he saw a Potts machine.

X Q. 47. Suppose the Alsip & Drake muller had its blades four inches apart, and make the same supposition with reference to the cutting cylinder of the model of figure 262 of Knight's Dictionary and state, if you please, whether they would then be practical in the operation of disintegrating clay, assuming the cylinders of a full-sized machine to be each twenty inches in diameter?

Objected to as incompetent.

A. The effect in the Alsip & Drake machine would not be very different from what it is as shown by the model because the clay passes between rollers no matter what construction the upper or feeding cylinder may be, consequently the clay is not left in the condition that the Potts machine leaves it. Your question assumes that the rollers of the machine shown in page 89 of Knight's Dictionary shall be of equal diameter, one of them a smooth roller, and the other a bladed roller with blades four inches apart, with those rollers placed in proper relative position to each other and with proper relative speed the effect upon the clay would be the same as in the Potts machine if the knives in the periphery of the roller did not clog and retain the clay.

133 Redirect examination.

Questions by Mr. BRADFORD:

R. D. Q. 48. Referring to the Alsip & Drake patent, I call your attention to figure 2 and ask you that even supposing, as counsel for defendants would have you, that the muller is of the same construction as the bladed cylinder in the Potts machine and was placed in the same position with the opposite smooth-faced roll as you see it illustrated there, would its operation upon the clay be the same or similar to that of the Potts machine?

A. It would not leave the clay in the same condition, because it passes through crusher and roller.

R. D. Q. 49. From your knowledge of sizes and proportions of machines, what should you say was the distance between the muller and the roll C beneath it in a full-sized machine in accordance with that drawing?

A. It seems to be allowed to rest directly on the roller—I was going by this (pointing to the model)—by the drawing a considerable space is shown between roller C and the muller as it is called. To give any idea of the distance I would first have to assume that the roller C was of some specific size, assuming it to be thirty inches in diameter, the space between it and the muller as shown in the drawing would be about two inches.

R. D. Q. 50. With this understanding of the drawing please state whether or not if one of the Potts knife rolls were substituted for the muller, in the same relation to the roller C which you have assumed, would its operation upon the clay be similar or in any man-

ner like the operation of the Potts clay-disintegrator upon the clay, and if not, why not?

134 A. I think not. In the first place the distance between the two would be too great to get the effect of disintegration and as it afterwards has to pass between the crushing rolls the effect of the disintegration would be greatly destroyed.

R. D. Q. 51. Referring to the model of Creager's wood-polishing machine what is the character of the blades or bars which you find in the polishing roll?

A. They appear to be glass.

R. D. Q. 52. How would glass bars work in the cylinder of a clay-disintegrator?

A. I expect they would last a little while, if they didn't come in contact with too many stones.

R. D. Q. 53. In answer to question 15 you said that a mechanic, with the knowledge of the business of building disintegrators and familiar with the use of knives in the periphery of rollers for analogous purposes, would not enable him to fix the proper distance apart that the knives should be to produce the desired result so well before as after he had seen some one else do it. Had it been simply a mechanical expedient or the work of a mechanic to arrange this machine from his knowledge of the state of the art as it then existed, do you or do you not think, being in the manufacture yourself of clay-working machinery, that you would have had the machine arranged and manufactured in your own shop?

A. If I had thought of it, but I did not think of it. If the idea had occurred to me as it did to Mr. Potts, I would probably have carried it out as he did; but it never occurred to me.

And further the witness saith not.

T. E. CHANDLER.

135 Recess until 2 o'clock.

2 O'CLOCK P. M.

The parties met pursuant to adjournment.

Present: The same as before recess.

The taking of the testimony was resumed as follows, to wit:

J. J. W. BILLINGSLY, a witness of lawful age, being called as a witness in behalf of complainant and being first duly sworn, in answer to interrogatories proposed by Mr. E. W. BRADFORD, deposes and says as follows, to wit:

Question 1. State your name, residence and occupation.

Answer. My name is J. J. W. Billingsly; I reside in the city here, and my occupation is editor and publisher of the Drainage Journal and also of the Clay Worker of this city. I am of the company of T. A. Randall & Co.

Q. 2. What is the character of the publications which you have mentioned?

A. The Drainage Journal is devoted to farm drainage and the manufacture of drain tile; the Clay Worker is devoted to the manufacture of all kinds of clay goods, excepting probably ware such as

finer ware, such as table ware; it includes the manufacture of brick, terre cotta, sewer pipe and other clay goods.

Q. 3. Are you familiar with clay-working and the different processes employed in working clays and different machines employed in carrying out those processes?

A. Yes, sir; I think I am.

136 Q. 4. Please state the extent of any experience you have had by which you have acquired acquaintance or familiarity with such things?

A. I have been engaged in the publication of the journals referred to for the past twelve years. In that time I have made it my business to visit the various clay-working establishments that I might be fully informed as to the machinery and methods of working clay for various purposes.

Q. 5. Are you familiar with the operation and result accomplished by the machine known as the Potts clay-disintegrator, as shown in patents 322,393 and 368,898 to C. & A. Potts?

A. I think I am. I have seen the machine in operation occasionally.

Q. 6. Please describe the character of work this machine is intended to accomplish in clay-working, its manner of operation, and the result in the art?

A. Well, the machine is intended to disintegrate the clay; it consists of a revolving cylinder with steel knives or bars set in the perimeter extending beyond—probably a quarter of an inch beyond the outer surface. There were two methods of feeding the clay against this cylinder; I am not familiar with the terms usually used by mechanics in describing these, and it is therefore necessary for me to describe it in my own way. In one instance they used the rolls in feeding the clay between the roll and the revolving cylinder both revolving but the one having the knives in it revolving much more rapidly. Another, the clay was fed in between the revolving roll having the knives and an apron, I call it an

137 apron, disintegrating the clay as it passes through between the apron and revolving cylinder by means of the knives or bars. The result is a very thorough disintegration of the clay separating the particles and mixing them evenly throughout. The clay coming in contact with this disintegrator is thrown quite a distance back and forth under the machine, unless carried directly by an apron into some other machine, pug mill or machine to press into brick or tile. In working clays it has been found that clay beds are usually composed of different stratas of clay. In the manufacture of brick and tile it is found advantageous usually to thoroughly mix the different stratas so as to secure uniformity in the goods manufactured. This disintegrator seems to effect or produce this result in a very satisfactory manner, where the clay is mined from top to bottom as is usually done, the clay is thoroughly mixed dry uniformly and burn with less danger of damage, or cracking, in shrinking.

Q. 7. Please state what machinery or class of machinery was

used within your knowledge prior to the Potts inventions for doing the work which they are designed to do?

A. The disintegration of clays had received some attention, before the introduction of this machine; it had been found desirable to crush the clay at least, and for this purpose rolls were used of different diameters and revolved so as to pass the clay between them, the distance apart of the rolls varying, sometimes a half an inch apart or less or more. The clays in passing between the
138 rolls came out in sheets. The objection to this method of working clay was the difficulty of tempering the clay uniformly; the small cakes would very frequently pass into the pug mills and through the pug mills and dies forming what might be called laminations, which is very objectionable in the manufacture of ordinary clay goods. In tempering the clay with water the outside of the cakes or sheets of clay would became wet while the inside would be practically hard and the whole mass unevenly tempered unless allowed to remain for a very considerable length of time in a soak pit. In the disintegration of the clay with the Potts machine clays may be worked directly from the bank passing through all the stages of manufacture to the drying room.

Q. 8. Had any attempts been made by clay-work people within your knowledge to overcome the defects in the art which you have named prior to the Potts inventions? If so, please state.

A. The old system of disintegration and thorough mixture of clays was the old washer, used to wash clay until the water would hold clay largely in distention; it was then allowed to stand in a pool till the clay particles settled, the water being drawn off afterwards and the clay dried until the necessary plasticity to work it was secured. Another method of disintegration was to spade up the clays in the fall season of the year and allow the clay banks to "weather" until the disintegration was effected by the action of the air and frost and waters. I believe that grinding rolls had been introduced, one roll revolving more rapidly than another, to
139 effect the same result; either process before named was expensive and required a very considerable length of time to effect the disintegration desired. The last-named process of grinding has not been introduced, so far as I know, very successfully.

Q. 9. Was the question of simplifying, shortening, or cheapening these methods of disintegration which you have mentioned one that had received any considerable attention or thought among clay-working people to your knowledge prior to the Potts inventions?

A. The disintegration and mixtures of clays received a great deal of attention before this time. The best method of disintegration, mixing and tempering clay was discussed very fully at the different conventions that met in several States for the purpose of considering such questions as related to the manufacture of both brick, tile and sewer pipe.

Q. 10. Please state the advantages afforded the art of clay-working by the Potts inventions at the time they were introduced, if, in your opinion, there were any.

A. The disintegration of the clay by the use of the Potts disinte-

grator and the ease with which the clay after being disintegrated was mixed and thoroughly tempered made the introduction of this machine a very great advance in the art of clay-working and it was so considered by clay-workers, and in my own opinion no machine has so fully simplified the work of disintegration, mixing and tempering, as the introduction of the Potts disintegrator.

Q. 11. Please state briefly the specific advantages which it seems to you the Potts clay-disintegrator afforded the art.

140 A. First, is the thoroughness of the disintegration; second, the thorough mixture of the clay; third, the rapidity of the work done; fourth, the uniform tempering of the clay secured by its disintegration; fifth, the better character of the ware or clay goods manufactured from the clay, on account of its uniformity of mixture and of tempering. I may add that the working of the clay is direct from the bank without difficulty.

Q. 12. Are these advantages such as would render, in your opinion, the manufacture of clay products less expensive and more economical, or not?

A. Yes, sir; they might be manufactured, I think, at less expense, and secure a better character of goods, with less loss.

Q. 13. When did you first become acquainted with the Potts inventions?

A. I am not positive as to time; if my recollection serves me right, the first machine of theirs that I saw in operation was at their machine shop, not far from Union station, in the winter of '86 and '87, I think, probably in the fore part of the year '87. I am not positive as to dates.

Q. 14. What was your own opinion of the machine, the character of the work it performed, as compared with other machines and other processes at the time you first saw it?

A. I was very favorably impressed, both with the character of the work done and the speed with which it was done. I said at the time that it was a very great advance in the line of clay-working machinery. Indeed, I considered it a marvel, and I have

141 seen no reason to change my opinion in regard to it since the day I first saw it.

Q. 15. I will call your attention to Respondent's Exhibit Model of Alsip & Drake patent before you, and also to a copy of Defendant's Exhibit Alsip & Drake Patent, and ask you to examine said exhibits and state if you understand the construction and purpose of the machine which they illustrate?

A. I don't know that I ever saw this machine in operation. From the drawings—I have not read the description—I should judge that one or two cone rollers were used with a roller revolving above them and intended to cut the clay as it passes between the grooved roller and the smooth roller. I judge from the diagram that the grooved roll might revolve directly above the smooth roll and cut the clay as it passes between. The effect would be, as a judge, to cut the clay into strips, which, if it afterwards passes between the rolls, would be compacted into cakes, as from any other smooth-roll crusher. The revolving roll above would serve as I

clod-crusher and would assist the clay in feeding into the rolls. This is only a hasty opinion, formed by looking at the diagram handed me.

Q. 16. I ask you to examine the model more carefully as to the manner in which the frame in which the top roller has its bearings is mounted, and I also call your attention to this language in the specification of the patent: "A further object is to provide a mulling mechanism in connection with said machine for the purpose of breaking the larger lumps and clods as they are fed therein,
142 and which may automatically move up and down to permit the passage of stones, and the like." * * * "The horizontal frame G to which the muller H is secured is pivoted by means of a bolt or rod *g* to two stationary upright posts *g' g'*, which are rigidly secured in any suitable manner to the frame A." * * * "Said muller H is grooved in the manner shown to form teeth or sharp-pointed corrugations *h* 3 which serve by the weight of said muller to cut or crush the lumps of clay as the same are fed into the hopper J preparatory to passing between the rollers C D," and ask you if in view of the information here given if you wish to add to or modify your last answer?

Question objected to for that the quotations are not so complete as to give fully the construction of the frame carrying the muller and its means of support, etc.

A. After looking at the models and the operations probably intended in its construction I do not consider it a clay-disintegrator at all. The corrugated roller revolving above the two cone rollers is probably intended to serve as a clod-crusher and feeder to the cone rolls. The machine as a whole is probably intended for a clay-crusher simply and stone-separator, the cone rolls having the effect in revolving to carry the stone to the end of the rolls where they could be discharged.

Q. 17. Suppose the knifed cylinder of the Potts machine was mounted on pivoted bearings which would vibrate as does the frame supporting the muller in the Alsip & Drake patent, would there be any difference in its working, in your opinion, and if so, what?

143 A. If I understand the question it is that the roll—smooth roll, of the Potts disintegrator—if mounted on pivoted bearings so as to revolve near to the roll having the steel bars and knives, what would be the difference in the working of the machine as compared with the muller on the Drake machine. I should think there would be quite a difference. The roll would serve to press the clay against the disintegrating knives or bars that are set in the rolls which revolves rapidly, thus effecting the disintegration of the clay, while in the case of the Drake machine the corrugated rolls would simply serve to feed the clay into the smooth rolls, the clay passing through between the rolls as in any other clay presser.

Q. 18. You did not understand the purport of my question. In the Alsip & Drake patent the frame on which the muller is supported is pivoted and vibrates. I asked you what would be the

effect on the operation and result of the Potts machine if its knifed roller were mounted in a similar manner.

A. I don't think it would effect the thorough disintegration of the clay at all.

Q. 19. If the knifed roller of the Potts machine were mounted on a vibrating frame so that any hard substance could throw it away or lift it away from the smooth roll, as in the Alsip & Drake patent such substances may lift the muller, then how could the Potts machine disintegrate clay?

A. It would not disintegrate it thoroughly or even efficiently.

Q. 20. In the Potts machine does the relative positions of the rollers make any difference in its operation and result?

144 A. It would make a very great difference in the disintegrating of the clay if the smooth rolls and the roll containing the knives should be separated too far apart. In the manufacture of some clays it is not necessary that the rolls should be very close together, but it is necessary that they be uniformly the same distance apart so as to secure a uniform disintegration of the clay.

Q. 21. Please state whether or not, in your opinion, the machine shown in the Alsip & Drake patent could be made to perform the work or accomplish the result of the Potts clay disintegrator without material alteration in its construction.

Question objected to as too indefinite upon which an intelligent answer could be based, as the word material is about as definite as a piece of chalk.

A. In my opinion the Alsip & Drake patent is a clay-crusher only while the Potts machine is a disintegrator of clay. The former would require a radical change to perform the work of disintegration as compared with the Potts machine.

Q. 22. I call your attention to the model before you, marked Defendants' Exhibit, Creager's Wood Polishing Machine, and ask you to examine the same and state if you understand its construction.

A. I think I do.

Q. 23. Please state if, in your opinion, it could be used for the same purpose as that for which the Potts clay-disintegrator is designed or if it could accomplish the same result?

145 A. Not without material change.

Q. 24. I call your attention to the model before you, marked as Respondent's Exhibit Model of Figure 262 of Knight's New Mechanical Dictionary and also hand you a copy of said figure marked Respondent's Exhibit from Knight's Dictionary No. 2 and ask you to examine the same, and state if understand the construction and purpose of the machine there illustrated?

A. I think I do.

Q. 25. Please state, if in your opinion, said machine could be used to accomplish the same work and result as that accomplished by the Potts clay-disintegrator.

A. I think not, without material change: I could give some reasons for it I expect.

Q. 26. Please give your reasons fully.

A. The spaces between the radial blades would very soon fill with clay so as to make a smooth roll, practically. The flutes in this roll C would also fill with clay so as to make it practically smooth on the outer surface and this is especially true of wet plastic clay. They are difficult to work on account of adhering so readily to any unevenness.

Q. 27. I also hand you a copy of Respondent's Exhibit Extract from Knight's Dictionary No. 1 being a copy of figure 6864 therein, and the accompanying description, and ask you to examine it, and state if you understand the machine there illustrated.

A. I think I do. I think the same difficulties would arise from the use of this machine as indicated in the use of the others,
146 that the spaces between the knives would fill with clay and render it practically useless for the purpose of disintegrating clay.

Q. 28. I also call your attention to a copy of Defendant's Exhibit, Butterworth Patent, and ask you if you understand the machine there illustrated, and if you do state what use it would be, if any, in performing the function of the Potts clay-disintegrators, giving your reasons for your answer?

A. I think I understand the construction of the machine. I don't think it would serve any such a purpose as the Potts disintegrator. One principal reason is that the knives have notches in them and will allow the clay to pass through unevenly disintegrated; second, that the springs which serve in this machine to press the apples against the revolving cylinder, would allow larger and hard clods to pass through, probably, without disintegration. In my opinion the machine would not serve as an efficient disintegrator of clays.

Cross-examination.

Questions by Mr. MOORE:

X Q. 29. Are you a mechanic?

A. I never studied to be a mechanic at all; I suppose I have a mechanical mind by natural endowment, for the reason that I have always, from my childhood, taken an interest in the construction of machines.

X Q. 30. But, as I understand it *it*, you never learned the trade and you never studied theoretically mechanics?

Question objected to as immaterial.

A. No, sir.

147 X Q. 31. These crushing rolls that you speak of as having been used prior to the date of Potts' patents for the preparation of clay to make brick, do you know why it was that they were so speeded that one ran faster than the other?

A. To effect in some sense a grinding in clay.

X Q. 32. Do you know how much faster one roll ran than the other?

A. I do not understand that there was any set rule; some manufacturers might make one difference and others another difference.

X Q. 33. The question was intended to ask you what you knew in that regard—at what relative speeds have you actually known the different rolls of such a pair to be operated in grinding clay?

Questions 31, 32 and 33 objected to.

A. I have probably heard, but do not now remember.

X Q. 34. Have you any recollection at all about it? Did the faster of the two run fifty per cent. faster than the other, or did it run five times as fast, or did it run twenty times as fast. I want to know, in short, just what you know about it.

Objected to as immaterial and incompetent.

A. In the discussion of the question of the preparation of clay in conventions and in visiting machine shops where such machines are manufactured, I have frequently heard it stated that the machines were so geared as to effect a more rapid revolution of one roll than the other, in order to have a grinding effect on the clay.

148 X Q. 35. But you have no recollection of how much faster one ran than the other?

Objection repeated.

A. No definite recollection.

X Q. 36. What was the relative positions, that is, the distance from each other that such a pair of rolls was usually set for grinding clay?

A. The distance apart of the rolls varied in the crushing of different clays. I have heard a half inch mentioned, a quarter of an inch, more or less.

X Q. 37. Did you ever observe such a pair in operation, if so you can state where you saw it operated and by whom, and how far apart the rolls were, and what kind of clay was being ground through those rolls?

A. I remember to have seen a pair of crushers in operation at J. W. Penfield's but I don't remember definitely the distance apart. As to the kind of clay it is very difficult to describe the clay more than to say that it was common clay. I remember also of seeing a crusher in operation at Springfield, Illinois, the Wallace manufactory, in which I remember the rolls were set a half inch apart, the clay was common clay such as is usually manufactured into tile in Illinois.

X Q. 38. Are these the only two sets you have ever seen?

This question and the one preceding are objected to as immaterial.

A. I visited a great many factories in the past twelve years and very many of them used crushers.

149 X Q. 39. Well, can you recollect the ratio of speed that one roll of the pair ran to the other of all the rolls that you ever saw in operation?

Same objection.

A. I do not remember now definitely the speed of any particular roll.

X Q. 40. Do you know how fast the Potts rolls run relatively in their present machines?

A. I do not.

X Q. 41. Do you know the distance apart that the Potts rolls are fixed in their disintegrators?

A. I do not; but I think the machines are so constructed as to be set at different distances apart suited to the clay that may be worked.

X Q. 42. If in a pair of crushing rolls one is so speeded as to go faster than the other wouldn't that have a tearing or disintegrating effect upon the clay?

A. That would depend very materially on the clay. Some clays are so smooth in texture that the rolls would slip rather than disintegrate.

X Q. 43. Do you understand drawing?

A. Only from a common-sense standpoint.

X Q. 44. Counsel for complainant put the drawings of two or more patents before you, are you quite sure you understand the drawings of either one?

A. I think I do.

X Q. 45. What was your object in going around to those different brick yards, that you say you have been going around to for twelve years past—I mean your business object?

150 A. As stated in the beginning of my testimony, I am the editor and publisher of a publication devoted to the interests of clay-working, and I have gone around that I might acquaint myself fully with the various operations of manufacturing clay into brick, terra cotta, drain tile and sewer pipe that I might write intelligently of the subject.

X Q. 46. You are also one of the proprietors of that journal, are you not?

A. I am the sole proprietor of one, the Drainage Journal, devoted to farm drainage and the manufacture of drain tile, and the coproprietor of the publication of the Clay Worker.

X Q. 47. The Messrs. Potts & Company are among the heaviest advertisers in the Clay Worker, are they not?

A. Yes, sir; they are advertisers in the Clay Worker.

X Q. 48. But are they not very heavy advertisers in the Clay Worker, much heavier, for instance, than Jonathan Creager's Sons, respondents herein?

Questions objected to by counsel for complainant as incompetent to prove any issue herein and immaterial.

A. Both parties are heavy advertisers, possibly Mr. Potts (C. & A.

Potts) may occupy more space occasionally than Jonathan Creager's Sons. I have not, however, examined the books to determine this matter definitely.

X Q. 49. Weren't you informed before you were called to testify, in an interview between yourself and counsel for complainant, or complainant's expert, that the model you now have your hand
151 upon, if it was operated, that the flutes in the wooden roller would fill up and that the spaces between the knives in the other roller would fill up so that it couldn't be operated?

A. I was shown the model before me and the objection referred to was mentioned by myself on first sight.

X Q. 50. What did they say to you in relation to that objection?

A. I do not remember; possibly they agreed with me.

And further the witness saith not.

J. J. W. BILLINGSLY.

ALBERT POTTS, being called as a witness herein and first being duly sworn, in answer to interrogatories proposed by Mr. E. W. BRADFORD, deposes and says as follows, to wit:

Question 1. State your name, residence and occupation.

Answer. Albert Potts, Indianapolis; general manager for the corporation of C. & A. Potts & Company.

Q. 2. How long have you been connected with C. & A. Potts & Co.?

A. About two years and a half.

Q. 3. Were — present yesterday during the taking of the testimony of George Potts herein?

A. I was.

Q. 4. Do you know the whereabouts of witness George Potts today?

A. Blairsville, Pennsylvania.

152 Q. 5. During the cross-examination of Mr. George Potts by Mr. Moore various references were made by witness George Potts when questions relating to dates would arise to certain books and papers, which, he testified, would fix the dates referred to definitely. I ask you if you know what books and papers or bills he referred to, and if you do where they are?

A. I do. They are now here on the desk.

Counsel for complainant asks counsel for defendants to take the witness on the stand and the papers and books he has with him to refer to and ask any questions which he would have asked witness George Potts in relation to these matters had it been possible for him to be here with the books today, as requested for counsel for defendants last night.

Counsel for respondent is mindful of the fact that complainant's counsel declined to accede him this privilege until he, complainant's counsel, had first examined the books to see if he was entirely safe to let respondent's counsel ask questions concerning them; nevertheless, in a spirit of appropriate thankfulness proceeds to ask the witness:

X Q. 6. First, I will ask the witness what places are those in the book in his hand that he has specially marked as I observe. I ask him to turn to those places and shoot out the information that has been specially prepared to deluge me with.

Counsel for complainant objects to the question as improper in assuming that a "deluge" of information has been prepared
153 for counsel for respondents. He also notifies counsel for respondents that no preparation of such information has been made with his consent, but that he has endeavored, with the assistance of witness, to find all the books and papers which counsel for respondents manifested a desire to have access to and has brought them before him in their original condition, simply having first referred to them himself for the purpose of acquainting himself with their contents, as he believed it his duty to do.

A. I don't know as the papers were put there as a mark, but since opening the book I find that the order for the first two roll disintegrator- manufactured by C. and — Potts & Co. is entered. I can't give the date definitely as it is not marked, but I find on the forward page it is dated January 1st, on the following page January 29, 1887. So as near as I can judge or tell this order was entered between the first of January and January 29, 1887.

Redirect examination.

Questions by Mr. BRADFORD:

R. D. Q. 7. By reference to your records when do you find that the first Potts clay-disintegrator was made? I refer to the style of machine shown in the first patent.

A. The pattern on these machines was began December 15, 1884. The first machine was completed and shipped to the Sheridan tile works, Sheridan, Indiana, April 10, 1885.

R. D. Q. 8. When was the first two-roll machine built, as shown by your records?

154 A. The first two-roll machine, which was our experimental machine, was built about the first of December, 1886, and shipped to Pike & Castle, Shenoah, Ill., about January 27, 1887.

Whereupon the further taking of testimony was adjourned until tomorrow, Wednesday, March 12, 1890, at 9:30 o'clock a. m.

WEDNESDAY, *March* 12, 1890—9:30 o'clock a. m.

The parties met pursuant to adjournment.

Present, the same as on yesterday.

The redirect examination of ALBERT POTTS was resumed by Mr. E. W. BRADFORD, as follows, to wit:

R. D. Q. 9. Are you acquainted with the parties composing the firm of Jonathan Creager's Sons, the defendants herein, and if so, how long have you known them?

A. I am, and think I met Mr. Harry Creager in the winter of 1886.

I went to Cincinnati about the 22d of December in '86 and there met Jonathan Creager and Frank Creager.

R. D. Q. 10. How long have you been connected in any capacity, whether your present or any other, with the C. and A. Potts & Co.?

A. About five years. One year of that time I was not directly connected or employed by them, but was at their works and office most of the time.

R. D. Q. 11. Are you familiar with their business transactions during the years 1886 and 1887?

A. I am.

155 R. D. Q. 12. Did the C. & A. Potts & Company of your knowledge have any business relations with Jonathan Creager's Sons or the parties composing the firm during those years or at any other time, and if so what were they?

A. They did. November 24th, 1886, until October 31st, 1887, we furnished, or C. & A. Potts & Company, to Jonathan Creager & Sons four of their number two or double-roll disintegrators.

R. D. Q. 13. Were the machines you have mentioned sold and shipped directly to Jonathan Creager & Sons?

A. They were.

R. D. Q. 14. Where?

A. At Cincinnati. I can't say that they were all shipped directly to Cincinnati, possibly Creager & Sons in ordering gave the shipping address to parties to whom they were furnishing machines. If so such machines were charged directly to Creager & Sons and not to parties to whom they were shipped.

R. D. Q. 15. They then purchased these machines from the C. & A. Potts & Company to supply their trade, did they?

A. Jonathan Creager & Sons claimed to work any and all clay direct from the bank without the use of soak pits with the brick machine and pug mill they now manufacture. In many locations the clay was of a hard tenacious nature and required grinding or disintegrating before passing into the pug mill. They then used our disintegrator for this purpose it being the only machine that would do the work.

156 R. D. Q. 16. I asked you if to your own knowledge they purchased of the C. & A. Potts & Company the clay disintegrators necessary to supply their trade?

A. They did.

R. D. Q. 17. For how long a time did they thus purchase these machines of the C. & A. Potts & Company, and when did they cease to purchase them, and why did they cease to purchase them, if you know?

A. The first machine was shipped and charged to them November 24th, '86; the last one furnished them was in October, the 31st, '87.

R. D. *R.* 18. How do you determine these dates?

A. I have the ledger of C. & A. Potts & Company before me in which these charges are made.

R. D. Q. 19. Were four machines all that Jonathan Creager's

Sons purchased of the C. & A. Potts & Company; I mean by machines, clay-disintegrators?

A. They purchased five machines. I think possibly I said four the first time, but there are five charges here.

R. D. Q. 20. Do you know of your own knowledge how they regarded these machines during the time they were selling them?

A. Yes, sir.

R. D. Q. 21. Please state.

A. Why, by letters that Creager's Sons sent us, and statements that they had made to us.

R. D. Q. 22. Have you any such letters convenient for reference, if so you may produce them?

Objected to as irrelevant and immaterial, and the introduction of all such letters.

R. D. Q. 23. You may read the letter which you have produced.

157 A. "The grand automatic brick machine, pug mill and clay-grinder, Jonathan Creager, inventor and builder; brick molds and brick-makers' supplies generally. Office, 133 West Second street, Cincinnati, Ohio, February 5, 1887.

"To C. and A. Potts & Co., Indianapolis, Indiana.

"GENTLEMEN: The conveyor aprons were shipped from Zanesville on 3d inst. Finally got everything to working beautiful, and you now have another big reference for your disintegrators. Steadman, of Aurora, Indiana, also has one at work at Zanesville. Will equip another large yard in Pittsburg at once, and will mail you shipping directions for another No. 2 disintegrator. On account of the first elevator proving so unsuccessful we are having a hard time getting Harris Brothers to settle. Are promised settlement from Townsend first of next week. Our new elevator takes the cake. I never seen their equal. Hope we can get your heavy disintegrators in at Pittsburg to take the place of dry pans, for grinding shale. If can get one in can get in half a dozen. We are putting in three more of our improved machines there. Will be in Pittsburg next week and will quote you from there as to the prospects, etc. It was a bad job all around at Zanesville, and we would advise you to see our new elevators before sending out any more. Would not have worked so long there, but they intended to get Penfield to put up his elevators. Don't want any of that in ours. Will remit just as soon as can get money.

"Very truly, J. CREAGER'S SONS,
"Per H."

158 Letter produced was introduced in evidence, and marked Complainants's Exhibit, "Letter from J. Creager's Sons."

Respondent's counsel objects to this testimony in addition to the foregoing objection that the testimony is not rebuttal, and gives notice now that he will move to have it stricken from the record for that reason.

R. D. Q. 24. Did the conveyors mentioned in above letter have anything to do with the clay-disintegrators?

A. Nothing as to the working of the disintegrators or the pulverizing of the clay, they being used to elevate or carry the clay from under the disintregator to the brick machine or pug mill.

R. D. Q. 25. Why did Jonathan Creager's Sons cease purchasing the clay-disintegrators from the C. and A. Potts & Company, if you know?

A. When we made Jonathan Creager & Son prices on these machines, we made a special discount from our regular selling price, with the understanding that all machines should be paid for in cash within thirty days from date of shipment. Creager & Sons never paid without giving us great trouble in having to write and make dratts, which were never paid, for those machines. To show that, on November 23, 1886, we shipped them one machine and on January 10, 1887, another. We received no money for them until June the 27th, 1887. On August 31st, we shipped one which was not paid for until January 23, 1888; for this one we had to sue. At the time of bringing suit we gave Creager & Sons notice that we would furnish them no more machines.

159 R. D. Q. 26. Do you know of your own knowledge when they commenced manufacturing the machines which the C. and A Potts & Co. allege herein are infringements of their patent in suit?

A. I am not positive as to when I saw their first machine, but think it was in July or August, 1888. I do not know the exact date as to when they made their first machines. The machine I speak of above I saw in operation in New Jersey. I don't remember the city.

R. D. Q. 27. I ask your attention to the model before you marked Respondent's Exhibit Model of Creager's Wood Polishing Machine, and ask you if you understand its construction.

A. I do.

R. D. Q. 28. I call your attention to a small piece of tin inserted between the sides of the frame of said machine in front of the barred roller therein in the form of the side of a hopper, and ask you to suppose that the machine was so constructed and state your opinion of whether or not it would work in disintegrating clay or perform the functions of the Pott's clay-disintegrator.

A. Being one of the inventors of the Potts clay-disintegrator, our first experiment was made with the machine having a large roller with projecting blades and a stationary apron and bar set close to the roller having the projecting blades in it. After building this first machine we tested it in the shops of G. H. Zscheech & Company of Indianapolis, and found that we could not get a particle of clay through this machine for the reason that we had no means of feeding the clay against the cutting roller. The clay simply

160 laid on top of the stationary bars, and as we fed the clay into it gradually filled the hopper and covered over the roller. We possibly kept the belt on this machine an hour or more, and then gave it up, concluding we would have to make or devise some

means to force the clay against the cutting roller. Having made these changes by using the vibrating apron described in our first patent, we made the machine work successfully in all clays excepting very wet and sticky clays, as found in eastern Illinois and the western part of the State of Indiana. In these clays the machine with the vibrating apron did not work successfully, for the reason that the clay stuck to the apron and gradually formed a cover over the roller so that no clay could pass into the machine. I know that in the model of the Creager wood-polishing machine that if a hopper, as shown by the piece of tin, were placed in the machine they would have the same machine as our first experimental one, and that it could not possibly take through the clay fed to it.

And further the witness saith not.

ALBERT POTTS.

OSCAR W. BOND, being called as a witness on behalf of complainant herein, and first duly sworn in answer to interrogatories proposed to him by Mr. E. W. Bradford, deposes and says as follows, to wit:

Question 1. Please state your name, residence and occupation.

Answer. Oscar W. Bond, 43 years; Chicago, Illinois; solicitor of patents.

161 Q. 2. Are you the same Oscar W. Bond who has testified before herein on behalf of complainants?

A. I am.

Q. 3. I place before you a copy of patent 322,393 to C. & A. Potts; a copy of patent 368,898 to C. & A. Potts, complainant's patent in suit; a copy of the testimony taken on behalf of defendants herein, each exhibit or a copy thereof introduced by defendants in said testimony taken on their behalf, and ask you to examine said exhibits, patents and the testimony of James W. See, defendant's expert witness, and state whether or not you find in the exhibits before you the substance or the equivalent mechanical devices which form the subject-matter of claim six of said patent 322,393 and claims one and two of said patent 868,898 and to examine the testimony of said witness See and make any comments or pass any opinions thereon you see fit, stating particularly and fully any instances where you do not concur with the opinions given by him, giving in full your reasons for your answer.

A. (1.) The patent No. 322,393 to C. & A. Potts is for an improvement in clay-disintegraters in which a revolving cylinder is the means for removing successive portions from a mass of clay automatically pressed against such cylinder. The cylinder shown and described in the patent is one having on its periphery a series of scraping bars which project beyond the periphery of the cylinder in such manner as to remove and throw down portions of the mass of clay and for this purpose the knives or scraping bars are adjustable so as to present a sharp corner to coact with an opposing face

162 and to remove the clay. It is this cylinder in its combination in a clay-disintegrator that forms the subject-matter

embraced in the sixth claim of patent No. 322,393. That is to say, this claim is for the element in the clay-disintegrating machine of a rotating cylinder armed on its periphery with a series of scraping bars adjustably secured in grooves formed in the periphery of the cylinder and having the adaptability of scraping or removing portions of a mass of clay presented to the cylinder and discharging the removed portions in the condition of finely divided clay for future manipulation.

(2.) I do not understand from the drawings and descriptions of the cylinder which forms the subject-matter of the sixth claim of the patent No. 322,393 that such claim is broadly for a cylinder having adjustable cutting bars or scraping bars; but is for a cylinder having scraping bars in its periphery so set and arranged that it will perform in a clay-disintegrator the office of removing successive portions from a mass of clay automatically pressed against the cylinder in such manner that the scraping bars will act on the clay and remove portions thereof to be discharged in the condition of finely divided clay, and have such cut clay thoroughly separated. It is this construction of a scraping cylinder adapted to work clay that is embraced in the sixth claim of this patent, and not the providing of a cylinder with adjustable knives as found by Mr. See—that in my opinion constitutes the novelty of the Potts patent, as summed up in said sixth claim. That is to say, it is not the were
providing of a cylinder with adjustable knives which forms
163 the novelty of the cylinder of the sixth claim of patent 322,393, but it is a cylinder having adjustable scraping bars on its periphery when such scraping bars and cylinder are combined and arranged to produce practically and successfully the result set forth in the specification of the patent and illustrated in the drawing.

(3.) I have given this explanation in order that my further answer in connection with the numerous patents which have been introduced by the defendants and experted by Mr. See, may be clearly understood, and I might add further that while I do not consider a result is patentable it is no more than fair in considering the prior art to regard the office that is to be performed and the result that is to be accomplished as entering into the merit of the invention.

Butterworth Patent.

(4.) The patent to Butterworth, No. 49744, dated September 5, 1865, is for an apple-grinding machine or cider mill, in which is employed a cylinder having its periphery armed with a series of cutters having serrated or toothed edges, which form a series of cutting projections with chisel-shaped edges. And these cutters are adjusted so as to project beyond the periphery of the cylinder, the object being to grind apples for the manufacture of cider. The grinding operation being performed between the cutters and a series of depending pivoted plates, which are held so as to yield independently, one from the other, by means of a series of springs, one spring for each plate, and the patent states that these plates are made yield-

ing for the purpose of allowing hard foreign substances to force a plate out and pass such substances without injuring the part.

164 (5.) It is true that this patent, No. 49714, shows a cylinder armed with adjustable cutting knives on its periphery, but such knives are of a peculiar construction necessary to perform the work of a cider mill in grinding apples in conjunction with a co-acting yielding surface, but, in my opinion, it is not the cylinder armed with scraping bars adjustable in grooves in the periphery of the cylinder of the sixth claim of patent No. 322,393 in its combination in a clay-disintegrator, for shredding the clay, automatically presented to the cylinder. The cylinder of patent No. 49714, with its coacting depending plates, which yield under pressure, if removed from a cider-mill and placed in a clay-disintegrating machine, would not perform the office nor produce the result of the cylinder covered by the sixth claim of patent 322,393, in shredding clay, for the reason that the nature of clay is one that would render the devices of patent 49714 impractical and inoperative by reason of the sticky, adhesive condition of clay generally used in making brick. It would require, in my judgment, a reorganization and a change of the construction of the cylinder and knives of this patent 49714, and the face which coacts therewith, to render it capable as a machine for the purpose for which the improvement of the sixth claim of the Potts patent is devised, and such changes and reorganization of this cider-mill machine to adapt it for use as a clay-disintegrator, are ones not contemplated or found in the patent number 49714.

(6.) The patent 49714 has a cylinder armed with special cutting blades for a special purpose, and the Potts patent has a cyl-

165 inder armed with scraping bars for a special purpose, and one arrangement could not be used in place of the other without radical changes, and as mills one could not be used interchangeably with the other. And, for the reasons given, I am clearly of the opinion that the novel feature found in the sixth claim of the Potts patent, No. 322,393, is not embodied in the construction of the cider mill shown in patent 49714, when the use to which the cylinder with its scraping bars and its combination in a clay-disintegrator is taken into consideration. Nor do I think a cylinder, with the special knives of patent 49714, is one that is adapted or could be used successfully in the shredding of a mass of sticky clay for the reason that the knives are not of a form contemplated and found in the Potts patent 322,393, but are of a thin blade with chisel-shaped cutting edges which would soon become useless, if practical at all, for scraping off and discharging moist clay in a fine condition. I might add that, in so far as relates to adjustability, the knives of patent 49714 are stated to be adjustable, but I do not understand that the sixth claim of the Potts patent 322,393 is merely for or claims adjustable knives. Nor does the reading of such sixth claim warrant a conclusion to the effect that the patentees claimed to have been the original discoverers of adjustable knives, but do claim by the sixth claim of their patent, as an element in the combination of a clay-disintegrator, a cylinder armed

with adjustable scraping bars, and this element in its combination as claimed by the inventors of patent 322,393 is clearly, in my opinion, not found in the patent No. 19714.

166 *Ennis Patent.*

(7.) The Ennis patent No. 225,976 is for a machine for preparing paper pulp in which an engine roll is found having on its periphery a series of cutters, set in grooves in the periphery of a cylinder, so as to be in close proximity one to the other. This engine roll is located directly over a bed plate, also having a series of blades, and the office of the rolls and its coacting bed plate is to tear up or cut the material for the paper pulp. The engine roll is located adjacent to a breast in the pathway for the material being operated upon, and performs the usual office of raising the material over the breast, and the patentee, in order to lessen the work of the engine roll in this respect has provided an agitator or propeller which circulates the mass of material. The engine roll, as I understand the construction shown in this patent, is the ordinary engine roll, consisting of a cylinder having a periphery filled with knives, and this engine roll is in no sense the cylinder with its adjustable scraping bars in its combination in a clay-disintegrator, called for by the sixth claim of patent No. 322,393; it is not a cylinder having a series of adjustable scraping bars on its periphery adapted to shred or remove small portions of a mass of clay automatically pressed against its periphery, and its construction is of a nature that would render it wholly impractical, in my opinion, for the use for which the combination of the sixth claim of patent No. 322,393 is intended; the engine roll, with its arrangement of blades shown forms, in effect, a cylinder with a series of buckets on its peri-
167 phery which would soon become filled with the damp, moist, sticky clay, and render the device wholly inoperative, if it were operative at all, as a shredder for clay contemplated in the Potts patent No. 322,393, in a very short time.

(8.) I do not understand that the engine roll of patent 225,976 has adjustable blades, as the distance between its blades and the blades of its coacting bed plate is had by raising and lowering the bed plate; nor do I understand that this bed plate is one that would automatically operate to present moist clay to the shredding cylinder, as called for by the Potts patent No. 322,393, nor do I see how it would be practical to carry a mass up the inclined pathway or breast of a paper-pulp machine and have the ordinary engine rolls of such machine shred or remove portions of the clay and carry such removed portions up and over the breast and deliver it in a finely pulverized or divided condition, as called for in the operation of the Potts patent.

(9.) The Ennis patent is for a construction of machine for working the material for paper pulp, and it would be wholly impossible, in my judgment, to use the construction of machine shown in the Potts patent for the use of the Ennis machine, and to take the Ennis machine and endeavor to use it for a clay-disintegrator, as

contemplated in the Potts patent, would also be impractical and impossible for successful operation. The cylinder of the Potts patent embraced in the sixth claim as a part of the combination in a clay-disintegrator, is one having scraping blades on the periphery adjustable in grooves and operating by a quick blow to shred the clay and discharge it in a finely pulverized condition, and
168 for this purpose, as shown by the drawings of said patent, the scraping bars with which the periphery of the cylinder is armed is arranged on the cylinder a distance apart for the purpose designed, while in the engine roll the blades are close together, forming, in effect, buckets on the periphery, instead of open spaces between the bars, as in the Potts construction, and these buckets would naturally fill with moist, sticky clay, especially when such clay is packed against the breast, as shown for the coacting plate in the Ennis patent.

(10.) I am therefore clearly of the opinion that the engine roll of the Ennis patent is not and does not embody the Potts invention embraced in the sixth claim of patent 322,393.

Recess taken till 2 p. m. of same day at same place.

2 O'CLOCK P. M.

The parties met pursuant to adjournment.

Present, the same as before recess. The witness resumed his answers as follows, to wit:

Frost Patent.

(11.) The Frost patent is for an improved grinding cylinder for paper engines, in which the improvement consists in applying the grinding plates so that they can be moved outwardly from the circumference of the cylinder, and the improvement consists in two heads between which is a series of metallic bars which serve as abutments for supporting thin steel grinding plates, and the grinding plates are inserted between this backing plate and a second backing plate, the two backing plates forming jaws for hold-
169 ing the grinding blades between them, and by loosening the backing plates the grinding blades can be moved out or in. The patent simply covers and points out a novel construction of the grinding cylinder for engine roll of a paper-pulp machine, and belongs to the same art as patent No. 225,976, and for reasons stated in considering that patent I do not find in this patent No. 53598 a construction of cylinder such as is called for by the sixth claim of patent No. 322,393, as this Frost patent wholly lacks a cylinder barred on its periphery with adjustable scraping bars, so arranged as to perform the required office of shredding a mass of clay and discharging the shredded portion in a finely divided condition, as contemplated and called for by the cylinder of the sixth claim of complainant's patent 322,393. Again, the form and arrangement of the grinding blades of patent No. 52598 and the completed cylinder would be one that would naturally retain moist sticky clay, instead of shredding and discharging small portions of the mass of clay

as described in patent 323,393. The cylinder of this Frost patent constructed as shown and described in said patent is not the cylinder of the sixth claim of the Frost patent and could not, in my opinion, be used as contemplated in the Potts patent.

Van Name Patent.

(12.) The Van Name patent No. 291,654, of January 6th, 1884, is for a roller for grinding mills and relates to a construction of the peripherical surface of such a roller with alternating blades of hard and soft material. It shows a cylinder with two dovetail angular grooves and four longitudinal grooves which
170 grooves are for the purpose of laying around the periphery of the cylinder the hard and soft metal, and the completed roll would be one having a smooth periphery without any projecting blades, and such a cylinder, in my opinion, does not comply with the requirements of a cylinder of the construction called for by the sixth claim of the Potts patent No. 322,293; it is not a barred cylinder, but a smooth-faced one; it is not a scraping cylinder with projecting blades or bars, but a smooth-faced cylinder having a periphery made up of alternating strips of hard and soft metal, and there is not found on the periphery of this cylinder any scraping blades, either adjustable or non-adjustable, and if used in a clay-disintegrator such cylinder would not operate to scrape or remove portions of a mass of clay, but would operate, in connection with a suitable coacting surface, to spread the clay in the form of a sheet.

Peabody Patent.

(13.) The Peabody patent No. 92997 is for a cotton-seed huller in which there is a revolving cylinder having on its periphery a series of tangential knives, each knife at its cutting edge having in front, in the face of the cylinder, a groove, and this knifed cylinder coacts with a series of fixed knives to present a proper cutting surface for the seed. The knives in patent 92997 are adjustable for the purpose of increasing or diminishing the cut and the knives are shown as having a cutting edge of a chisel shape. The cylinder of this patent No. 92997 does not have the scraping bars adjustable in grooves called for by the sixth claim of the Potts patent No.
171 322,393, and if a construction of cylinder like that in patent 92997 were placed in a clay-disintegrator to take the place of the cylinder in the Potts patent it would be inoperative, as the soft, moist clay would pack in the concavities beneath the blades on the surface of the cylinder and form a surface which would support the clay in the hopper and perform no operation so far as disintegrating is concerned.

(14.) I do not consider for the reasons given that this patent, No. 92997, discloses the subject-matter embraced in the sixth claim of patent 322,393 of a cylinder in a clay-disintegrator, having scraping bars on its periphery, adjustable in grooves of the cylinder by which a mass of clay will be shredded.

Mayfield Patent.

(15.) The Mayfield patent No. 110,497, dated January 10th, 1871, is for a grinding mill in which is employed a grinding wheel or cylinder, having on its periphery a series of knives or plane bits arranged tangentially in a manner similar to that in patent No. 92997, and these knives coact with bars to grind grain. This patent, so far as the grinding cylinder is concerned, is like the Peabody patent, and like that patent is for grinding, by a cutting process, between a revolving cutter and a stationary one. The cylinder of the Mayfield patent and its coacting face do not and could not be made to perform the work required of the sixth claim of the Potts patent, as in the Mayfield the knives do not project in a manner to act on and shred a mass of clay, and, with wet, sticky clay, the openings in front of each knife of the Mayfield cylinder would soon become filled, preventing any cutting action, and the clay
172 would simply lay in a receiver. The plane bits of this Mayfield patent, as also the knives of the Peabody, are of a nature not adapted to be used as scraping bars in a clay-disintegrator, as shown in the Potts patent 322,393. The knives of both these patents are adjustable, but, as I have already stated, the Potts patent, by its sixth claim, is not for the discovery of adjustable knives *per se*. For the reason stated the Mayfield patent does not embrace the invention summed up in the sixth claim of the Potts patent 322,393.

Smith Patent.

(16.) The Smith patent, No. 242,387, is for an apparatus for preparing wheat for grinding, employing a cylinder similar to the cylinder of the Mayfield patent, with a series of plane bits projecting from its periphery. The reasons given for not finding the Potts invention, of a cylinder with adjustable scraping bars on its periphery in its combination with a clay-disintegrator, in the Mayfield patent, apply equally as well to this Smith patent, and for these same reasons the Smith patent does not, in my opinion, embody the subject-matter of the sixth claim of patent No. 322,393.

Rudy Patent.

(17.) The Rudy patent is for a clay-pulverizer in which is employed a series of pulverizing or grinding rollers, each having a fluted periphery, and the rollers are stated to be cast in sections, either grooved fine or coarse, so that by one shaft, rollers of different degrees of fluting can be made. The object is simply to pulverize clay and discharge it onto seives, for the removal of stones
173 and so forth, and the rollers are in no sense the barred cylinders called for by the sixth claim of patent No. 322,393, and could not be made to perform the work of such cylinder, as in wet, sticky clay, which is the kind of clay that has to be disintegrated, the periphery of the roller in this patent, 160,618, would soon fill, producing a smooth surface which would not even perform the office set forth in the Rudy patent, and much less the work required

of the cylinder and its adjustable scraping bars of the sixth claim of patent 322,393.

(18.) The novelty which I find in the sixth claim of the Potts patent No. 322,393 is a cylinder having on its periphery scraping bars adjustably secured in grooves longitudinal of the cylinder, in its combination in the clay-disintegrating machine, to perform the work of shredding or removing small portions of the mass of clay automatically pressed against such cylinder, for the finely divided clay to be discharged, thoroughly separated and disintegrated, and it is this disintegration of moist, sticky, laminated clay that it is the office of the Potts cylinder to perform, and to slice off or shred small portions of the mass of clay, that constitutes the novelty and utility of the invention of this sixth claim, and not the mere adjustment of the scraping bars, which adjustment is one condition pertaining to the invention in order to have a correct relation between the scraping cylinder and its coacting face.

(19.) This feature of novelty and utility found in the Potts invention, and in the sixth claim of the Potts patent, is not found
174 in the cider-mill patent of Butterworth, the paper-pulp machine to Ennis, the pulp-grinder to Frost, the grinding roller to Van Name, the cotton-seed huller to Peabody, the grinding mill to Mayfield, the apparatus for preparing wheat to Smith, and the clay-pulverizer to Rudy, for in no single one of these patents, nor in all combined, do I find, in a clay-disintegrator, the scraping cylinder shown and described in the Potts patent No. 322,393, and set forth in the sixth claim of said patent; nor do any one of the said patents show or describe or point out a use or purpose analogous to the use or purpose of the Potts invention; nor, in my opinion, could any one of the several machines, exhibited in the various patents, be used in the manner and for the purpose of the Potts invention, and for these reasons, and for reasons stated in considering the several patents, I do not find the novel feature of the Potts invention, as covered by the sixth claim, in any of the patents above referred to.

Potts Patent 368,898.

(20.) I have already, in my previous examination in this case, stated my opinion as to the subject-matter embraced in the first and second claims of this patent 368,898. The patent relates to clay-disintegrators, and is stated to be an improvement of letters patent No. 302,323, in which a swinging plate was employed as the feeder to the shredding cylinder, while in the present patent, No. 368,898, a revolving plain cylinder, set oppositely to the shredding cylinder, is used as the means for presenting the mass of clay to the bars. The invention is clearly defined and pointed out in claims one and two of this patent, so as to distinguish it from the in-
175 vention of the prior patent, so far as relates to the feeding means. The patent 368,898 sets forth that the abutting surface, namely, the vibrating plate, of patent 322,393 was limited in extent and unchanging in position so that it became rapidly worn, and by substituting the revolving cylinder new surfaces are con-

stantly presented to the cutters so that the wear is even and regular throughout its circuit. And, furthermore, the specifications state that the revolving roll will work wet or sticky clays with perhaps one-third of the power necessary with the vibrating plate machine. Furthermore, the specifications state that the vibrating plate tends constantly to crowd or squeeze the passing clay, whereas the revolving roll yields continuously, so that clogging is less apt to occur, at the same time that the clay is finely and evenly shredded, the cutter cylinder moving, by preference, more rapidly than the companion feed-roll in order to accomplish this effect. The specification states that it has been very common to employ a set of rolls between which the material passed as the rolls were revolved, but in such machines the operation of the rolls was merely to break up the clods of clay and squeeze or crush the same, whereas by our invention the clay is positively cut into fine shreds or clippings in much better condition to be tempered and molded than by the old form of disintegrating machine.

(21.) I understand from the drawings and the specifications that the cutting cylinder of this patent No. 368,898 is the same cutting cylinder as that shown and described in the patent 322,363
176 which I have been considering, and that the invention of this patent 368,898 is combining with said cutting cylinder a continuously revolving feed-cylinder, and the patent fully sets forth the benefits and advantages of such combination and distinguishes the invention in the summing up found in claims one and two. The distinction between these two claims is well defined and the issuing of the patent clearly shows that such distinction was contemplated by the inventors and allowed by the Patent Office, the office thereby admitting the distinction.

(22.) The cutting cylinder of this patent 368,898 is not, as I understand it, a cutting cylinder *per se* but a cylinder having on its periphery adjustable cutting bars arranged and operating to shred or remove a small portion of the mass of clay and discharge the removed portion in a disintegrated condition and the specification states that these cutting bars instead of being adjustable can be formed with the cylinder, thus providing for either adjustable or non-adjustable cutting bars having the adaptibility and location on the cylinder, to shred or cut away small portions of the mass of clay, and this cylinder with these shredding bars, in connection with a smooth-faced feeding cylinder, is what constitutes, in my opinion, the novelty of the Potts invention in patent 368,898. And this novel feature of the invention in patent 368,898 is not found or disclosed in the various patents and models to which my attention has been called and now before me.

English Patent 1671 *of* 1874.

(23.) This English patent is for a construction of a grind-
177 ing roll in which metal ribs are fixed to an ordinary plain or cylindrical roll, to have such ribs take a spiral, screw or "archimedian" course, and secured by metal rings, or screws, etc.

The drawings show a single roll having ribs thereon as stated. And the patent states that the scrapers usually employed with plain grinding rolls cleans all at the same time, referring to the spiral ribs. It will appear from the descriptions and the drawings that this invention pertains simply to grinding rolls, and has for its object to obtain the ordinary grinding surface of such roll by means of spiral ribs.

(24.) This English patent does not show nor describe the cylinder of the Potts patent No. 368,898 having therein a series of scraping bars; it does not show a plain revolving cylinder operating as a feed-cylinder; it does not show a supporting frame, nor does it, in fact, show anything except a roll having screw or a spiral running rib on its periphery. The cylinder of the Potts patent is one that will shred clay in connection with a revolving feed-cylinder. The roll of the English patent could not be made to shred clay, but might act to grind clay of a wet and sticky nature, to the extent of running such clay out in a sheet form, but not disintegrating it as designed by the Potts invention, and as the spiral channels of this English roll are closed at the ends it would seem to me that, in practical effect, the roll is simply a plain grinding roll, as the channels would soon fill with the sticky clay. Again, I understand that the cutting cylinder of the Potts patent must be one which will give a quick sharp blow of the cutting bars to shred the clay, and
178 this is provided for in the Potts patent by projecting one edge of the bar and spacing the bars on the cylinder, while in the English patent No. 1671 no quick, sharp blow could be had, as, in effect, the surface presented would be a plain continuous surface.

(25.) This English patent No. 1671 does not, in my opinion, disclose or point out or even approximate the invention in claims one and two of patent 368,898 for the reason that the roller is not one adapted to shred clay, and even if it were, is not found combined in a clay-disintegrator, as shown and described in the Potts patent 368,898, and for the reason before given.

Gale Patent.

(26.) The Gale patent, No. 61922, is for a straw-cutter, having a pressure cylinder and a knife cylinder. The knife cylinder carries spiral knives for the purpose of giving a draw-cut. The knives are set at their ends in the heads of the cylinder, and a considerable space is left between their back edges and the surface or periphery of the cylinder, and the machine acts in the usual manner of all straw-cutters, and would be a successful machine for cutting straw without doubt. It does not have a cutting cylinder provided with cutting bars in its periphery and combined with a feeding cylinder and a frame and adapted to feed and shred clay, as called for by the Potts patent No. 368,898, for this straw-cutter would be incapable of the same work as that performed by the Potts machine, owing to the open condition of the cutting cylinder and the construction of the knives. This construction is one not conditioned

for the operation of the Potts machines. And again, the
179 pressure cylinder in this Gale patent is not a fixed cylinder in the sense set forth in the Potts patent, but is supported and *and* held by a spring.

(27.) I do not find in this Gale patent the combination of elements summed up in the said claims of the Potts patent 368,898, combined and arranged for the purpose of disintegrating clay, as called for by the Potts invention; nor do I find the special cutting cylinder of the Potts invention adapted to shred clay; nor do I find an arrangement of feeding cylinder, cutting cylinder and frame arranged to produce the result attained by the Potts invention. And for these reasons and those already given this Gale patent does not, in my opinion, embody the Potts invention.

Whittemore Patent.

(28.) The Whittemore patent No. 33119, dated August 20th, 1861, is for a straw-cutter similar, in its general construction to the Gale straw-cutter, having, however, straight cutters instead of spiral. The reasons already given for not finding the subject-matter of the Potts invention in the Gale patent apply equally as well to this Whittemore patent, and for these reasons it may be briefly stated that the Whittemore patent does not embody the invention shown, described and claimed in the Potts patent 368,898.

Blackie Patent.

(29.) The Blackie patent No. 67280, dated August 21st, 1866, is for a machine for pressing tobacco by which tobacco leaves are pressed and formed into continuous strips and then cut into
180 plugs of the required length, all with one operation. This machine, if used to work clay, would have the clay pressed and packed in the form of a sheet and this sheet would be cut into strips, as that is the purpose of the operation of the machine briefly stated in connection with tobacco leaves. The machine shows a roller, having a series of spiral knives thereon, which coacts with a smooth-faced roller and cuts the tobacco into strips. It does not show a cylinder provided with cutting bars and operating to give a sharp, quick blow to remove or shred small portions of a mass of clay, and, if it did have such cylinder in place of the knife cylinder, the tobacco machine instead of cutting strips into plugs would simply break the strips and would change wholly the construction and operation of the machine, and, if the knife roller in this tobacco machine were used in a clay-disintegrator, as designed and set forth for its use in the tobacco press, there would be no shredding or disintegrating of the clay, but simply a cutting of the clay after it had been worked into a sheet form into strips, which would in nowise disintegrate and destroy the layers or lamina of the clay, as would be the operation in the Potts machine.

(30.) I am therefore thoroughly of the opinion that this tobacco press does not show and describe or point out the combination of elements constituting the Potts invention and adapted to perform

the work of the Potts machine, for it does not have a cutting cylinder with the cutting bars adapted to give a sharp, quick blow to shred or remove small portions of a mass of wet, sticky clay, combined with a feeding cylinder and a frame by which the clay
181 is properly fed in position for the cutting or shredding operation, which constitutes the novelty of Potts' combination.

Fletcher Patent.

(31.) The Fletcher patent, No. 116,029, is for a pulp engine or crusher, one form of which shows a cylinder provided with projections or cogs, which engage with the projections or cogs on the lower cylinder, and the upper cylinder, between the cogs, is provided with buckets, where the corresponding spaces between the cogs of the lower cylinder are flattened, so that the surface presented is one having alternating buckets and cogs. This construction is shown in figures 1 and 2. The engine operates in the usual manner of pulp engines. The pulp flowing over the riser and entering the buckets on the lower side of the upper cylinder is carried up by such buckets over the breast and thrown out over the back fall or riser, and the pulp is stated to be crushed by passing through the alternating buckets and cogs. Figure 3 is stated to show an equivalent construction in which the upper cylinder has buckets and cogs and the lower cylinder has apparently a plain periphery, but the operation of the engine is like that of the first figure. The patent 116,029 might be useful as a pulp engine; but would be an utter failure if attempted to be used to disintegrate clay of a moist, sticky, adhesive nature, as it would be impossible to move the clay up the riser to the engine, and clay delivered to the engine would simply adhere to and fill the buckets.

(32.) The patent 116,029 does not even have blades much less does it have cutting bars on the periphery of a rotating cyl-
182 inder, by which a quick, sharp blow can be had to shred or remove clay. It does not have a plain face between cutting bars for insuring a discharge and it does not have a single element necessary to the successful working of a clay-disintegrator, as shown and described and claimed in the Potts patent 368,898. It is simply and purely a pulp engine or grinder, and nothing else.

Alexander Patent.

(33.) The Alexander patent, No. 125,159, is for machine for grinding clay, in which an upper pair of double spiral-toothed crushing and grinding rollers are used to first grind the material and from which rollers the material passes between a pair of plain cylindrical rollers and is carried by an elevator to the mixing pans. The first pair of rollers are simply cutting rollers for crushing or breaking rocks, clay and so forth by pressure, operating, as I understand, on the principle of any rock-crusher, and the material thus worked by the first rollers has the finishing touch given thereto by the second or smooth rollers. Special stress is laid in the patent upon the spiral-toothed grinding and crushing rolls, which are of a double

spiral arrangement, and it is stated that rock, clay or other material, as it passes through between the spiral teeth of the rollers D *d*, is subjected to both a crushing and a grinding force and consequently could be more perfectly reduced from a lump or rock in a pulverized condition. But to secure a more perfect pulverization there is arranged under the rollers D D I, another pair of rollers, F F I, having plain or smooth faces. It would thus appear that the first pair of rolls crushes and grinds and the
183 second pair of rolls completes the pulverization, and with this construction of machine it would appear to me that with sticky or adhesive clay, if such clay were reduced by the crushing rolls, the second rolls would simply receive the clay and discharge it in a sheet form without any breaking or disrupting of the layers, which is not the condition sought to be attained by the Potts invention—the Potts machine, by reason of its cutting cylinder and the operation of its cutting bars, shredding the clay and completely destroying its cohesion.

(34.) The upper rolls of the Alexander patent have the teeth so arranged that the teeth of one roll interlock or enter the spaces between the teeth of the other roll, and the periphery of each roll is virtually filled with these teeth so that with the rotations of the rolls it would be impossible for the teeth to strike a quick, sharp blow to shred or remove a small portion of the clay, as called for by the Potts patent, for in the Alexander arrangement the rolls simply crush by pressure and grind the material, and the Alexander patent furthermore requires two operations to complete the pulverization, while in the Potts the blow that does the cutting likewise performs the disintegration.

(35.) I do not find in this Alexander patent the construction and operation shown, described and claimed in the Potts patent for the reason that the Alexander patent does not have a cutting cylinder with cutting bars arranged and operating to shred or remove the small portions from a mass of clay to thoroughly disintegrate the removed portion, combined with the feeding cylinder and
184 frame-work, as called for by the Potts. I am, therefore, for this reason and for the reasons given in considering the construction and operation of the machine of the Alexander patent, clearly of the opinion that such patent does not embody or disclose the Potts invention set forth in claims one and two of patent 368,898.

Wells Patent.

(36.) The Wells patent, No. 52472, is for a peat machine, in which the peat is delivered to a hopper and is broken, when delivered from the hopper, by revolving knives or arms which revolve between fixed knives or arms, and at the same time a supply of fine coal dust is delivered continuously to the broken peat; after the first reduction or breaking, the peat is passed between smooth cylinders of unequal diameter, or between cylinders which revolve with unequal velocities, which cylinders rub and grind the mass so as to reduce it to a very fine plastic state, and from these rubbing and

grinding cylinders the mass is carried through moulding cylinders or rollers constructed with triangular depressions, so arranged that when the depressions meet or articulate a cavity is formed whose sides are parallel, forming a mold by which the peat is delivered in a block form. The action of the rubbing and grinding rollers is one by which the lower cylinder will rub against and slip on that of the upper, and the peat is drawn between them as between feed-rollers, the lower cylinder rubbing the peat against the upper cylinder with a tearing and grinding action, for the reason that its surface moves with greater speed than that of the other, and at the same time crushing the peat, so that when it emerges from be-
185 tween them its fibers, that is to say, the undecomposed matter which is interlaced throughout the peat, is crushed and also torn to pieces. It will be seen from this that the action of these rolls is simply that of feed-rolls, with the additional feature of tearing off and crushing the peat, and the final result is reduction to a plastic state. And it must be borne in mind that before these feed-rolls commenced to act, the lumps of peat had been torn to pieces and reduced by the cutting knives or arms, for if this were not done the lumps of peat of a large size would not be operated upon, as contemplated in this Wells patent.

(37.) The defendant's expert states, in considering this Wells patent, "while the second pair of rolls are both armed with cutters." The patent states that the rolls E are molding cylinders and "these moulding cylinders have angular depressions in their periphery whose articulation form moulds of the shape of a parallelogram."

(38.) This Wells patent does not show or describe a cutting cylinder having on its periphery cutting bars, which act to shred or remove small portions from a mass of clay, combined with a feeding cylinder and a frame, as called for by the claims of the Potts patent 368,898. The action of the feed-rolls is to tear apart and crush; the action of the cutting cylinder and the feed-cylinder is to make a clean cut and deposit the cut portion in a disintegrated condition; the two devices do not operate alike—one tears apart and the other makes a clean cut—and with the Potts patent ma-
chine the disintegration of the layers, in a mass of clay, is
186 thoroughly and effectually done, while with the feed-rolls of the Wells patent wet layer clay would not be changed in the matter of its laminations, but would be simply compressed.

(39.) I am, therefore, clearly of the opinion that the Wells patent, No. 53472, does not show and describe the combination of elements shown, described and claimed in the Potts patent No. 368,898.

Case Patent.

(40.) The Case patent, No. 297,764, dated April 29, 1884, is for a feed-box for roller mills. The patent shows two pairs of rolls, one roll of each pair being serrated and the other smooth on its periphery, such rolls being of the ordinary construction of grinding rolls now generally used in flouring mills, etc. The two rolls arranged as shown in figure 1 would act to grind grain fed to them

through a feed-box, 14, in the usual manner of feeding grain to such rolls, by having the grain flow over the end of a feed-box, but if wet, sticky clay in large lumps were deposited to be acted upon by feed-rolls of the form and arrangement shown in figure 1 of this patent, the result would be that such rolls would be found wholly inoperative in reducing clay, because the serrated roll would at once fill with the wet and sticky clay, and, if the rolls would work at all, they would simply pass the clay through in the form of a sheet, without any disruption or breaking up of the layers. The patent does not have the essential feature in the Potts invention of a cutting cylinder armed on its periphery with cutting bars arranged and operating to shred or remove portions of clay from a mass of clay in combination with a feeding cylinder for
187 automatically bringing the clay in position for the cutting action of the bars and a frame, as shown and described and claimed in the Potts patent No. 368,898. The Case machine is for grinding grain; the Potts machine is for disintegrating clay and breaking up the laminations; one machine could not be used in the place of and perform the work of the other machine; the two machines are in no sense interchangeable.

(41.) I am, therefore, clearly of the opinion that the Case patent, No. 297,764, for the reasons above stated, does not show and describe a construction of machine similar to or in any manner resembling the machine shown, described and claimed in the Potts patent No. 368,898.

Recess until 7:30 p. m. of same day.

7:30 o'clock P. M.

The parties met pursuant to adjournment.

Present: The same as before recess.

The witness resumed his answer as follows, to wit:

Voelk Patent.

(42.) The Voelk patent, No. 231,512, August 24, 1880, is for a grinding mill for reducing grain to a coarse material, in which two burrs, each formed of a series of plates, each plate having on its periphery saw-teeth, and these plates have different diameters, so that when arranged on the shaft alternately they form a grinding burr, formed of plates of greater and less diameter, and the plates of the two burrs are arranged to have a plate of the greatest diameter in one burr come opposite a plate of less diameter in the
188 other burr, and these burrs coact with a stationary concave grinding surface. The saw-teeth of the two burrs point in opposite directions and the two burrs run together like rollers, and one moving faster than the other, and their peripheries being toothed in opposite directions, the grinding of the grain coarsely is done, one burr, the upper one, serving as a feed-roll and backing for the lower burr. The patent does not have therein a cutting cylinder, having on its periphery a series of cutting bars operating to shred or remove small portions from a mass of clay, combined with the plain-surfaced feed-cylinder, and a frame arranged as

shown, described and claimed in the Potts patent, No. 368,898. The machine or mill of the Voelk patent is one constructed and designed especially for coarse grinding grain, and could not be used as a disintegrator for operating on a mass of wet, sticky clay, for the reason that the toothed periphery, as he calls it, would soon fill with the clay and be simply smooth-surfaced rollers through which, if the clay could be fed at all, it would only pass in a sheet form without any breaking up of the strata of the clay. The Potts patent, through its cutting cylinder and arrangement of bars thereon, and its feeding cylinder, is a clay-disintegrator by which clay will be cut and finely divided, completely breaking up the strata, and this operation cannot be had with the saw-toothed plates forming the burrs of the Voelk patent owing to the nature of wet, sticky clay, which requires a clean cut to break up the layers, and such cut is not and cannot be had with a machine or mill of the Voelk patent.

189 (43.) I am, therefore, for the reasons given, clearly of the opinion that this Voelk patent does not show and describe a mill designed or which can be used for disintegrating clay as shown, described and claimed in the Potts patent 368,898.

Potts Patent No. 322,393.

(44.) This Potts patent, No. 322,393 has therein the cutting cylinder with its cutting bars shown and described in the later patent, No. 368,898, but such cutting cylinder in the patent No. 322,393 is shown combined with a vibrating feeding plate, and the patent No. 368,898 is for this special cutting cylinder combined with a continuous revolving feed-cylinder, and the patent No. 368,898 fully explains why the change in the feed-device was necessary, and with such change in the feeding device it appears from the patent 368,898 a perfect delivery and shredding of a mass of clay is had by the changed feed, producing a practical operation which before, with the vibrating feed, was found imperfect, owing to the nature of the material operated upon, and the further fact that with an unchangeable feed or abutting surface the surface would be rapidly worn away, which would require a new feed-plate or a readjustment, while with the revolving feed the contact surfaces are constantly changing, presenting new surfaces for the cutters, making the wear even and regular the entire circuit, and this feature is one of novelty and utility not found in the prior Potts patent No. 322,393. And, for this reason, I do not find the combination shown, described and claimed in the Potts patent 368,898 in the prior Potts patent No. 322,393.

190 *Alsip & Drake Patent.*

(45.) The Alsip & Drake patent, No. 320,905, dated June 30th, 1885, is for a clay-crushing machine, which will automatically separate stone, gravel and other foreign substances from the clay, as the latter is being ground, and which has the further provision of a mulling mechanism, in connection with said machine, for the purpose of breaking larger lumps and clods, and which will authomat-

ically move up and down to permit the passage of stones and the like. The grinding devices are two cone-shaped rollers, each having a smooth periphery, and the cone shape is for the purpose of discharging the stones, etc. The muller mechanism is a muller having its periphery grooved to fill the entire periphery with teeth or sharp-pointed corrugations; this muller is located above one of the cone-shaped rollers and is supported by a horizontal frame, which frame is pivoted between stationary upright posts, and two other upright posts located in front of the pivoting posts, serve as rests or supports for the frame G which carries the muller H, and to limit the downward movement and prevent contact with the roller C, above which the muller H is located, and is held clear from the roller C as shown in figure 2 of the drawings. The belt by which the muller is driven is so adjusted as to permit an upward movement of the said muller, in case of contact with stones or other hard substances in the clay. The patent also states it is necessary to adjust the weight or pressure of said muller to the varied consistency of stiffness of the clay, and this is cheaply, effectually and prefer-
191 ably done by providing stationary boxes upon the muller frame, on the opposite side of the pivoting posts, and these boxes are to be weighted according to the pressure required on the muller to break up the clods and large lumps of clay.

(46.) The grinding rolls of this Alsip & Drake patent are of a conical shape to discharge stones, and it is evident that if large lumps of clay or clods were delivered to the surface of these cone-shaped rollers, such large lumps and clods would be simply carried to the discharge end of the cone-shaped rollers and be thrown out of the machine without being operated on, and it is for the purpose of preventing this discharge of large lumps and clods that the inventors have evidently provided the muller, that is, the muller will break up large lumps and clods sufficiently fine to be fed to the grinding cylinders and pass through such cylinders and be operated upon. The muller was never intended or designed to coact with the cylinder C and shred or cut clay in small portions from a mass of clay, as this muller is never in contact with the cylinder C, and is always held clear therefrom by the post *g* 2; and even if the muller run against the periphery of the cylinder C it would not shred or cut clay, but might possibly assist in feeding clay to the grinding cylinders, if it did not, owing to its corrugation, form a backing for the clay, owing to the difference in the contour of the peripheries of the muller H and the cylinder C, one being straight and the other cone-shaped, and, furthermore, with wet, sticky clay the serrated face would soon fill up and the muller be simply a plain-surfaced roll, without any break in its face at all.

192 (47.) The cone-shaped cylinders C and D of this Alsip & Drake patent are the crushing cylinders, and with wet, sticky clay these cylinders would simply act to pass the clay between them in a sheet form without breaking up of the laminations, and the muller H would in nowise change this operation of the crushing cylinders C and D. Neither of the cylinders are speeded, and neither of them have cutting bars on their peripheries by which a mass of clay

would have small portions removed therefrom and discharged in a thoroughly broken-up mass.

(48.) I do not find in this Alsip & Drake patent anything pertaining to the inventions shown, described and claimed in the Potts patent No. 368,898, for the reasons above stated and for the further reason that this Alsip & Drake patent does not show and describe a cutting cylinder having cutting bars which operate by a clean cut to shred or remove a portion from the mass of clay, combined with a feeding cylinder and the frame as shown, described and claimed in the Potts patent No. 368,898.

(49.) The model of the Alsip & Drake machine is not correct, as the muller is represented as running in contact with the front cylinder, while in fact it is elevated and remains clear of such cylinder, and in order to carry out the full intention of the patent the boxes on the frame carrying the muller should be weighted to govern the pressure, but even if the muller rested upon the forward crushing cone, as shown in the model, the machine so changed would not be
the Potts machine shown, described and claimed in the pat-
193 ent No. 368,898, for the reason that the muller is nothing but
a clod-breaker or lump-breaker, and is in no sense a cutting cylinder, and even if it were a cutting cylinder and could be made to work with the cone-shaped cylinder C of the Alsip & Drake patent, the clay, after being operated upon, would be passed between the crushing rollers and delivered in a sheet form, and not broken up as with the Potts machine. The free upward movement allowed the muller, both in the model and in the patent, would naturally prevent its operation as *as* a cutter, as the resistance would naturally tend to raise the muller, even if it would perform any cutting. I do not, for the reasons stated, find in this model of the Alsip & Drake machine, changed, as it is, the combination or arrangement of elements shown, described and claimed in the Potts patent No. 368,898, for the reasons stated.

Creager Patent.

(50.) The Creager patent, No. 407,717, dated September 3, 1878, is for a wood-polishing machine, in which a cylinder of hard wood, glass, bone, ivory or metal, polished on its periphery and driven at a high speed in a direction contrary to the feed, so as to rub and slick the face of the board, is used, and termed a slicking roller. Underneath the slicking roller is a yielding pressure roller, and on each side of the slicking — are other pressure rollers coacting with stationary rollers for feeding the board. The evident design of the machine of this patent is to have a hard, smooth-faced cylinder, which will run opposite to the feed and smooth and polish the
board, the board being fed endwise into the machine, as in an
194 ordinary planing machine. The drawings show the slick-
ing roller with a smooth periphery, and the specifications describe it as highly polished on its periphery, and states: "I prefer that the periphery of the slicker be that of a perfectly smooth and polished cylinder;" there is no intimation, so far as I can find, in

this patent that the slicking cylinder was to be provided with blades of any description. The Creager model shows this slicker roller provided on its periphery with a series of projecting strips of glass, but just how these glass strips, projecting from the cylinder as they do, would perform the office of a slicker, it is hard to determine. I can understand how a cylinder, having on its periphery a series of glass strips lying flush with the periphery of the cylinder, would operate to polish and slick the board without breaking the glass and in the manner described in the Creager patent.

(51.) The Creager model, however, irrespective of its changed condition from the Creager patent, could not and would not operate as a clay-disintegrator without material and radical changes, and an attempt is made to change the nature of the machine by inserting a slanting piece of tin on the feed side of the rollers, and the patent states that this slicker roller runs in the opposite direction to the feed, so that if the clay was placed in the space between this slanting tin and the slicker roller, the only result would be that such clay would be thrown out again. If the slicker roller with its blades of glass were run in the direction of the feed of the machine it would simply back the clay up against the tin and form a compact mass beneath which the slicker roller would revolve
195 without the blades acting on the mass of clay; if the clay could be fed between the tin and the slicker roller, and between the slicker roller and the pressure roller beneath it, there would not be very much cutting, in my opinion, as the pressure roller would not be a solid cooeting surface, such as required for the disintegration of clay by a barred cutting cylinder. Again, the glass strips are, in no sense, the cutting bars contemplated in the Potts patent, 368,898, and a cylinder armed with these glass strips would not be operative in a clay-disintegrator, as the first stone struck would break them into pieces, while in the Potts disintegrator stones struck by the cutting bars of that machine would be either broken or thrown from the machine.

(52.) I am, therefore, clearly of the opinion that the Creager patent, No. 207,717, and the model of the Creager wood-polishing machine do not show or describe or in any manner point out a construction of machine adapted to operate successfully in disintegrating clay for the reasons above stated; nor do I think it would be possible, from either the patent or the model, to produce a machine combining the elements of a cutting cylinder with cutting bars on its periphery, a feed-cylinder, and a frame, as shown, described and claimed in the Potts patent, No. 368,898.

Knight's Dictionary Extract No. 1.

(53.) The cut and descriptive matter of this Exhibit No. 1 show a machine for removing hair from hides in which a cylinder is used having cast upon its periphery helical screw-blades running from
the center of the cylinder to the ends, and below this cylin-
195 der is a smooth-faced cylinder against which the upper cylinder runs sufficiently close to have the blades of the

upper cylinder scrape off the hair from the hide as it passes between the two cylinders, and for this purpose the blades of the upper cylinder must be of a nature to act without cutting or destroying the hide, so that the upper cylinder is, in effect, a smooth-surfaced, continuous cylinder, having a scraping action, by which the hair will be removed and carried to the ends of the cylinder. The scraping cylinder of this exhibit is not and for the purpose for which it is intended, could not be a cutting cylinder, as a cutting cylinder would utterly destroy the efficiency of the machine for the intended use; and if clay of a moist sticky nature were passed between the rollers of this Exhibit No. 1, the action of the feed-rollers, in my opinion, on the clay would be to pass the clay through the rollers in a sheet form without any disintegration, and without any breaking up of the layers as contemplated in the Potts patent, No. 368,898. I am, therefore, clearly of the opinion that in this Exhibit No. 1 is not found the combination of a cutting cylinder, having on its periphery cutting bars, which act to shred or slice off small portions from a mass of clay, a feeding cylinder co-acting with such cutting cylinder, and a frame, as shown, described and claimed in the Potts patent No. 368,898.

Knight's Dictionary Extract No. 2.

(54.) This Exhibit No. 2, by its drawing and descriptive matter, is for a rasping machine for grating roots, in which a drum having its periphery filled with radial blades and a fluted roller are
197 used, the drum forming a rasp and the fluted roller holding the root against the rasp until grated sufficiently fine to pass a throat piece shown below the fluted roller. The machine is illustrated in the model exhibit (model of figure 262, on page 89 of Knight's New Mechanical Dictionary). The model and the drawing both show a considerable space between the fluted roller and the rasp and the throat piece is shown in close proximity to the periphery of the rasp. Clay introduced into a machine like this (Exhibit No. 2 and the model thereof) would fall down and rest upon the throat piece and accumulate there; and, again, the surface of the fluted roller is one which would not present clay to a cutting cylinder to be acted upon cutting bars, the flutes leaving a greater or less space between the drum and the roller as the roller rotates. Again, the rasp shown in the Exhibit No. 2 and the model, while it might grate roots would be wholly inoperative as a cutting cylinder for disintegrating clay, as the blades fill the periphery of the rasp and forms smaller receptacles into which the moist, adhesive clay would enter, and fill up the periphery of the cylinder. Again, the rasp drum shown in Exhibit No. 2 and in the model, is one which would not be made to strike a blow of the nature required to cut or slice off portions from a mass of clay. Again, according to the model the blades of the drum are held at the end by wide bands, which would prevent contact of the blade with the fluted roller and prevent the blade from cutting against the roller, even if the roller were not fluted.

198 (55.) The machine of this Exhibit No. 2 and the model illustrating the same, are not adapted and could not be used to disintegrate clay, for the reasons I have given, and for these reasons and because the said Exhibit No. 2 and the model do not show or describe a cutting cylinder having cutting bars on the periphery, combined with a coacting feed-cylinder, I am clearly of the opinion that the invention shown, described and claimed in the Potts patent No. 368,898 is not in this Exhibit No. 2 and the model illustrating the same.

(56.) The Potts patent No. 368,898 fully shows and describes and covers by its claims a machine having the adaptability to, and performing the work of, effectually breaking up moist, sticky clay and discharging the clay in a fine disintegrated condition; and this is had by the combination of a cutting cylinder having cutting bars which act on the clay to cut or slice portions thereof from a mass, combined with a feeding cylinder by which the clay is properly fed to the cutting cylinder; and it is this combination producing the result set forth that, in my opinion, constitutes the novelty and utility of the Potts invention in patent No. 368,898; and this invention or improvement is not shown nor described in any of the prior patents and exhibits to which I have referred, nor in any of the model exhibits before me.

(57.) The patents, exhibits and model exhibit do not show or describe the cutting cylinder shown, described and claimed in the Potts patent No. 322,393 and neither do they show such cylinder combined with the feeding cylinder shown, described and claimed in the Potts patent No. 368,898.

199 Cross-examination.

Questions by Mr. JAMES MOORE:

Whereupon the further taking of this testimony was adjourned until tomorrow, Thursday, March 13, 1890, at 9 o'clock a. m.

THURSDAY, *March* 13, 1890—9 o'clock a. m.

The parties met pursuant to adjournment.

Present: The same as on yesterday.

The cross-examination of the witness was begun by Mr. MOORE as follows, to wit:

X Q. 4. Have your foregoing opinions been based exclusively upon a knowledge and experience in mechanical devices, their construction and operation in general, or have you had any practical experience in the use of devices for the purpose of pulverizing or disintegrating clay?

A. On a general knowledge and understanding of the working of mechanical structures generally, and the operation of such structures for the purposes for which they are designed. I have never operated a clay-disintegrator, but have seen one in use of the Potts construction.

X Q. 5. When and where did you see this disintegrator in use?

A. At the works of the Potts Company in this city prior to my former testimony in this case.

X Q. 6. Did that disintegrator have serrated or saw-like teeth?

200 Counsel for complainant objects to the question as incompetent.

A. It was a practical disintegrator; built according to the specifications and drawings of the Potts patent No. 368,898.

X Q. 7. I suppose I am to understand from this that the teeth were not serrated or saw-like, else it would not be practical?

A. Certainly. A serrated roller would be an impractical device for striking a blow that would shred or remove portions of a mass of clay of a wet, adhesive nature.

X Q. 8. You do not happen to know, do you, that Potts & Company have built since the date of the patent 368,898 disintegrators in accordance with that patent in every particular except that they have these serrated or saw-like teeth?

A. I do not, but can understand readily that a crusher to break dry (not adhesive) clay could be of that construction.

X Q. 9. Do you know that they took letters patent subsequent to the date of the patent 368,898 for a disintegrator having serrated or saw-like teeth?

A. I have seen the letters patent referred to which show cutter bars serrated, the object being, as I remember, to decrease the friction, requiring less power to run the machine. This construction of cutter bar would not be a serrated cylinder or roller on the plan of the muller in the Alsip & Drake patent. It would be, so far as having the feature of a sharp, quick blow, the same as the
201 barred cylinder of the prior Potts patent, and, as I remember, the tooth bars are arranged in a similar manner to the bars of the prior patents in their relation to the periphery of the cutting cylinder and the coacting feed-cylinder, and such bars and such tooth bars would shred and cut clay the same as the Potts prior patents, with the possibility as stated in this later patent of less friction.

X Q. 10. If I am correct I think I understand you to say in your direct examination that the Butterworth patent would not cut or shred clay because the teeth of its knives were serrated. Please explain how the serrated knife of the Potts patent will cut and shred while the similar knife in the Butterworth patent will not so act.

A. The knives of the Butterworth patent have their serrations chisel shape and the blade is thin and the first contact of the chisel-shaped edge with a stone or other hard material would break off the edge, the same as the running of plain iron or bit on to a nail will break the bit, and for these reasons, as stated, that the knife of the Butterworth patent would not be practical for the end sought in the Potts clay-disintegrator, for the edge of the knife would break out, leaving the knife or its blade flush with the surface of the cylinder, when no cutting action could be had.

X Q. 11. If I understand you correctly the difference that you mean to emphasize between the Butterworth knife and the knife of

the Potts patent 384,278 is that the latter is of heavier metal than the former; can you answer this categorically?

202 A. No; one is a knife made and adapted to grind apples; the other a bar designed and intended to shred clay.

X Q. 12. I only desire to get in an indisputable way at your exact meaning; I did understand that it was the difference of the thickness of the metal that made the difference in their efficiency which you pointed out; it appears that I was not correct in that; am I correct now in your meaning that the difference between their operations as you allege it, results from the uses prescribed for each in those several patents?

A. The difference in the structure of the two knives together with the operation of the two machines.

X Q. 13. Throughout your deposition I observe that you had no difficulty in stating, or did not appear to have any, that in case of some of the exhibits offered to show the state of the art that the knives or blades or corrugations were not at the proper distance apart upon their rollers severally to be adapted for the purpose of shredding clay; this conviction of yours appears to be firmly held and based only upon a general knowledge of the construction and operation of mechanical devices; now don't you think that a person skilled in the art of either, a man whose business it was to build brick machinery or to use it in the manufacture of bricks would be quite competent to judge of that question?

A. It would appear that such is the fact, by the Potts patents which are the first in the art, so far as I have been able to discover, to have the construction necessary to accomplish the desired end of shredding and breaking up a mass of wet, sticky clay. The

203 prior inventors were successful, probably, in constructing machines adapted for their specific work, but I do not understand that any of them have produced a machine on the principle of the Potts patent and operating as the Potts machine.

X Q. 14. Will the witness please give a categorical answer to question 13, or state his reasons for declining so to do and the question will be re-read to him if he desires it?

A. I have answered the question by stating that the Messrs. Potts constructed the machine and probably did so through their knowledge of what was requisite to attain the end sought. Certainly they showed inventive skill in constructing a cutter cylinder in its combination with a clay-disintegrating machine which would give a sharp quick blow as required for operation on a heavy mass of laminated sticky clay. None of the prior inventors and designers of special machinery have succeeded, in my opinion, in the accomplishment of producing a machine to attain the desired result in a clay-disintegrator.

X Q. 15. The witness is advised that question 13 did not refer to the Potts or any of them and was not intended to ask anything about their inventions, as I think clearly appears from the question, but as the witness appears to insist for some reason or other in declining to answer any question unless the Pott inventions are lugged in, I will say, to save him from embarrassment in that re-

gard, that for the purpose of this question I will admit that the Potts' are big Injuns, and now I want to know if the witness
204 will answer question 13 with a yes or a no, and if he does not that he states frankly the reason why he is afraid to?

Counsel for complainant objects to the question as improper and as stating erroneous conclusions.

A. Presumably the patentees and designers of all the different machines shown in the patents and exhibits offered by the defendants were skilled men, and the fact that none of them have produced a machine to disintegrate clay on the plan and principle of complainant's and defendant's machines would clearly indicate, that the answers I have given were in the negative until the period of the production of the Potts invention by them, to successfully construct the requisite machine.

X Q. 16. Then I understand you to mean that the person skilled in the art could not determine that question?

A. It seems that persons skilled in the art of constructing cider mills, roller mills, tobacco presses and other numerous machines, failed to do so.

X Q. 17. When speaking of several of the respondent's exhibits, including Mayfield and other similar patents, you stated that there was a recess in the periphery of the roller and under the knives, which recess would of itself prevent such machine from being used for the purpose of disintegrating clay. I would ask you do you mean by that that any cylinder armed with proper beaters or knives properly organized in every respect for shredding and disintegrating clay, but having recesses such as referred to under each knife, whether such cylinder would be within or without the inventions of the Potts patents as you understand the same? Can you give a categorical answer to this?

205 A. Recesses on a cylinder of the Potts construction, with cutting bars operating like those in the Potts patents would be a cutting cylinder similar to the Potts.

X Q. 18. Then, as I understand you, you withdraw previous testimony as far as it states, if it does state, that such recesses would, of themselves, make the cylinder on which they were inoperative, and place such cylinder without the category of the Potts inventions; am I right about this or am I not?

A. No; the Mayfield cylinder, constructed as shown and described in that patent, is not a cylinder having the proper cutter bars and proper arrangement as called for in the preceding question.

X Q. 19. The question is repeated, and the officer requested to re-read the question, and the witness is advised that the previous answer does not at all meet the question, which says nothing about the construction of the Mayfield cylinder.

Counsel for complainant objects to question 18, and to its repetition, for the reason that it seeks to state as testimony of witness what has not been given in this cause.

A. Question 17 referred me to the Mayfield patent and testimony I had given relative thereto; question 18 continues the same reference, and I again answer no, for the reasons given in my answer to question 18.

X Q. 20. I will try and repeat question 18 so as to omit reference to special construction of any particular cylinder, otherwise than as it may contain a recess under each knife. Then, as I understand you, you withdraw previous testimony so far as it states, if it
206 does state, that recesses in the periphery of a cylinder immediately underneath the knives or beaters would of themselves make the cylinder on which they were inoperative and place such cylinder without the category of the Potts invention; am I right about this, or am I not?

A. No; as I have already testified that recesses in front of the bars of the Potts cylinder would not change such cylinder.

X Q. 21. Several times through your direct testimony you have stated with reference to several of respondent's anticipatory exhibits that they would not strike a blow. Is there anything in the adapting a knife or beater to strike a blow other than the rate of speed at which the cylinder is run?

A. Certainly.

X Q. 22. What else?

A. The location and relation of the cutters in their combination with the other parts of a machine to produce a certain result.

X Q. 23. The assumption intended, and I thought understood, was a cylinder armed with knives or beaters, or other devices, for cutting or breaking, and the question is, in any given case, whether each such cutter, etc., would not strike the requisite blow for disintegrating the clay, if the barred cylinder was run at a sufficiently high rate of speed? I am but trying in an honest way, even if feeble, to get at your meaning.

A. There is a distinction that is clearly evidenced by the numerous exhibits, patents and others to which I have referred. A spaced bar cylinder, like those in complainant's and defendant's ma-
207 chines, strike and cut; a serrated roller, like that in the Alsip & Drake patent, or a cylinder or engine of a paper machine, or a cylinder filled with spiral blades, would simply crush and tear without producing a clean cut. The patents show this.

X Q. 24. Then you mean, if I correctly understand you, that entering into the capacity to strike a proper blow is involved not only the speed at which the cylinder may run, but also the direction of the knives or beaters on the cylinder. Am I right?

A. Certainly. A construction and arrangement of knives which would not do the required work would most assuredly render the machine inoperative.

X Q. 25. Well, suppose the knives upon the periphery of the cylinder were staggered, as that phrase is usually understood among mechanics, and the cylinder was run at a proper speed, would such knives strike the blow that you think is the proper blow for disintegration?

A. If by staggered is meant the construction and arrangement of

knives as on the defendants' machine they certainly would strike a proper blow.

Y Q. 26. Could they be staggered in any way upon the periphery of a cylinder, using that word as it is in common use among mechanics, and the knives be incapable of striking the proper blow?

A. There might possibly be an arrangement in the staggering of the knives that would render them inoperative for the purpose intended. If staggered and arranged to give a sharp cut a cylinder so armed in its combination in a clay disintegrator would be within the scope of the invention.

208 X Q. 27. That is to say, knives however arranged would be within the scope of the invention, or, rather, the cylinder containing them, if they were capable of cutting and shredding clay, but if not so capable they would not be—that is, the cylinder containing them, within the Potts inventions, as you understand them? Do I correctly express your meaning?

Counsel for complainant objects to the question as endeavoring to state the meaning of witness' answer, which is so plain of itself as to be incapable of being misunderstood, and as stating the supposed meaning in a manner, thought by counsel for complainant, incapable of being understood.

A. The Potts patent 368,898 states that the cutting cylinder can be armed with cutter bars, arranged variously, and such cylinder in its combination would be within the Potts inventions, provided that the arrangement of the cutters, irrespective of how, was one that would perform the work designed to be done.

X Q. 28. Referring to the first three paragraphs of your third answer where you aimed to state your understanding of the invention of the Potts patent 322,393, I am left in a little doubt as to your exact meaning, and hence ask you to give a categorical answer to the following question, intended only to get at your actual meaning. I assume for the purpose of your answer, the question intended to be entirely hypothetical, that prior to the date of any invention on the part of Messrs. Potts but being engaged in the building of some sort of machinery for the making of brick and in addition

209 familiar with the various operations which clay underwent in the process of brick-making, had accidentally seen a cylinder which was exactly the cylinder subsequently shown in their first patent, but this cylinder was being operated for a purpose not only different from that to which it is applied in the Potts patent, but giving no suggestion of its capacity to use as a clay-disintegrating cylinder and was associated and combined with devices, no matter what construction, except that with them it could not be operated to disintegrate clay, and that the Messrs. Potts had adopted that cylinder shown it in connection whereby it could disintegrate clay, and applied for a patent, and had obtained it, receiving a claim in the exact terms of the sixth claim of said patent, I want to ask whether, in your opinion, this would have involved invention on

the part of Messrs. Potts, and second, whether that invention would be the same as the invention in the present patent?

A. As I understand the question it means that if under certain suppositions I would consider the sixth claim of the Potts patent as involving invention, and I answer: The combination of that claim does involve invention as the construction possesses novelty and utility, and my reasons have heretofore been fully stated in comparing the Potts machine and patents with the numerous patents and exhibits produced on the part of the defendants: the Potts cutting cylinder, with its combination, as set forth in the sixth claim referred to, is and would be novel and new, in my opinion, producing as it does a result not before accomplished in the art of disin-
210 tegrating clay. A construction of a machine in all respects similar to that shown, described and claimed in the combination of the Potts sixth claim would certainly be the invention of that claim.

X Q. 29. And it is upon this theory of invention, as I understand it, applied to the patents in suit, that your foregoing opinions have all been based; am I right?

A. Yes, the making of an operative machine for the purpose stated by the Potts patent, by the new combination and arrangement of the parts shown and described in the patents, is certainly invention.

X Q. 30. Are you not able to answer my last question categorically, with a yes or a no?

A. I answered the question yes, giving my reasons for my answer.

X Q. 31. I ask your attention to the language of the sixth claim of patent 522,393, and ask you whether, in your opinion, it includes anything more than the cylinder A, having a series of longitudinal grooves, and of the scraping bars C, adjustably secured in said grooves; in other words, I want you to assume that this cylinder, having this series of longitudinal grooves and the scraping bars C adjustably secured in the grooves, is removed from the other features and ingredients shown in the patents, although adapted if you please to be inserted with these other features; does this separated cylinder, having the grooves and scraping bars exactly as described, contain the invention in question?

A. The language of the sixth claim indicates clearly that it is a combination claim and is not capable of the assumption that
211 it was the intention of the inventors to claim broadly the cylinder A, with longitudinal grooves and adjustable cutting bars, if such cylinder was merely placed on a floor or bed without any action, as it would not then serve the purpose specified, which is clearly defined in the specification; in other words, I do not understand that by this sixth claim the inventors seek to cover broadly the cutting cylinder, *per se*, but do claim such cylinder as part of the combination in a clay-disintegrator.

Redirect examination.

Questions by Mr. E. W. BRADFORD:

R. D. Q. 32. I call your attention to the George Potts patent No. 384,278, referred to by counsel for defendants, and to the following language contained in the specification thereof: "The purpose of the invention is to reduce the power necessary to drive the disintegrator, more especially in working wet, sticky clays." * * * "The cylinders B C can be geared and driven in any well-known way, a convenient and efficient means for this purpose being set forth in the patent of C. & A. Potts for improvements in disintegrators, No. 368,898." * * * "In the application of C. & A. Potts referred to, the cutter bars *d*, each consist- of a straight blade, having a continuous edge set within a longitudinal seat or recess of the cylinder and securely retained therein with the cutting edge projecting slightly above the face of the cylinder. By the present invention the cutter bars, instead of presenting a single straight edge to the face of a companion cylinder, are indented as shown so as to form a series of teeth *e*, projecting beyond the surface of cylinder C.

212 The indentations in the successive bars of the series, about the surface of the cylinder, are interspaced, so that the teeth of one bar shall stand opposite to the spaces of the next bar in the traverse of the cylinder." * * * "Such parts of the mass of clay as remain uncut by the teeth of one bar are almost immediately thereafter shredded by the teeth of the succeeding bar, so that the result is to speedily disintegrate the clay with the same benefit as was derived from the Potts machine, above named, at the same time that the resistance is lessened because of the indented nature of the cutter bar." I ask you if you find the invention shown in the drawing, and thus pointed out in the specification of the George Potts patent, in defendants' exhibit (Butterworth patent), giving fully the reasons for your answer?

Objected to as utterly irrelevant.

A. I do not. The object and purpose of the George Potts invention is clearly set forth and defined in the question which I am answering. This object and purpose is not attained in the Butterworth patent to which I am referred; the knives or cutters of the Butterworth patent are notched or cut on their acting edges to form cutting projections with chisel-shaped edges, and these knives are arranged in the cylinder so that each chisel-shaped projection of one blade follows behind or in line with the chisel-shaped projection — the other blades, and not as stated for the projections of the blades in the George Potts invention. The arrangement of the George Potts blades is one producing a disintegrating cut across the mass of clay, leaving no portion uncut and broken up as to its layers, while the

213 Butterworth blade, if it would operate at all in a clay-disintegrator, would simply space out some of the mass leaving the remainder of the mass unbroken and undisintegrated.

R. D. Q. 33. Cross-question 29 reads: "And it is upon this theory of invention as I understand it applied to the patents in suit that

your foregoing opinions have been based, am I right?" Which question you answer in the affirmative; I would ask whether in answering said question you said your opinions, as given, have been based on the theory of invention as understood by counsel for defendant, or upon the theory of invention set forth in your answer to cross-question 28?

A. The answer is given on the basis of invention embraced in my answer to cross-question 28, and not on any supposed theory of counsel for defendants.

And further the witness saith not.

Counsel for complainant offers in evidence, for the use of the court, a copy of the patent 384,378, which is marked Complainant's Exhibit George Potts' Patent.

OSCAR W. BOND.

214 STATE OF INDIANA, } ss:
County of Marion, }

I, Harold Taylor, a notary public within and for the county of Marion and State of Indiana, do hereby certify that the foregoing depositions of George Potts, Stephen K. Fletcher, Thomas E. Chandler, J. J. W. Billingsley, Albert Potts and Oscar W. Bond were taken on behalf of the complainant, C. and A. Potts & Company, in pursuance to the notice hereto annexed, before me at the office of Messrs. C. & E. W. Bradford, in the city of Indianapolis, in said county, on the 10th, 11th, 12th and 13th days of March, 1890; that each of said witnesses was by me duly sworn before the commencement of his testimony; that the testimony of each of said witnesses was written out by Miss Minnie Carpenter, a disinterested party, in my presence; that the opposing parties, Frank F. Creager, *et al., was* present by Mr. James Moore, their attorney, during the taking of said testimony; that said testimony was taken at the office of Messrs. C. & E. W. Bradford, rooms 16 and 18 Hubbard block, and was commenced at 2 o'clock p. m. on the 10th day of March, 1890, was continued pursuant to adjournment on the 11th and 12th, and was concluded on the 13th of said month; that I am not connected by blood or marriage with either of said parties nor interested directly or indirectly in the matter in controversy.

In testimony whereof I have hereunto set my hand and affixed my seal of office, at Indianapolis, in said county, this 7th day of April, 1890.

[SEAL.] HAROLD TAYLOR,
Notary Public.

Received of C. & A. Potts & Co. $65.80 in full of notary fees for taking the foregoing depositions.

$65.80. HAROLD TAYLOR.

(Here follow diagrams marked pp. 215 & 216.)

217 And afterwards, to wit, on the 22nd day of August, A. D. 1890, the following motion was filed in the clerk's office of said court, clothed in the words and figures following, to wit:

Motion.

U. S. Cir. Court, South. Dist. of Ohio, W. D.

C. & A. POTTS & Co. }
vs. } No. 4244. In Equity.
FRANK F. CREAGER *et al.* }

And now come the respondents above named and move the court for an order *nisi* that the complainant above named put in additional security for costs, and that in the event of its failure to do so within a time to be named by the court this cause stand dismissed.

JAMES MOORE.
Respondents' Sol'rs.

And afterwards, to wit, on the 16th day of September, A. D. 1890, an entry was made upon the journal of said court clothed in the words and figures following, to wit:

Journal Z, p. 127.

Upon motion of defendants it is ordered that complainants put in further security for costs, either a bond in the manner required by the rules of the court or at its election deposit the sum of two hundred and fifty dollars with the clerk, this order to be complied with on or before the 4th day of October, 1890.

218 And afterwards, to wit, on the 3rd day of October, A. D. 1890, the following cost bond was filed in the clerk's office of said court, clothed in the words and figures following, to wit:

Cost Bond.

Circuit Court of the United States for the Southern District of Ohio, Western Division, *ss:*

C. AND A. POTTS & Co. }
vs. } Cost Bond. No. 4244.
F. F. CREAGER *et al.* }

I hereby acknowledge myself security for costs in this case in the sum of two hundred and fifty dollars.

FRANCIS LAMPE. [SEAL.]

Taken and acknowledged before me this 3rd day of October, A. D. 1890.

ROBT C. GEORGE.
Deputy Clerk U. S. Cir. Ct, S. D. O. [SEAL.]

SOUTHERN DISTRICT OF OHIO, *ss:*

I, Francis Lampe, a resident of said district, do solemnly swear that after paying my just debts and liabilities I am worth five thousand dollars in real estate within the jurisdiction of this court and subject to execution, levy, and sale.

FRANCIS LAMPE.

Sworn to and subscribed before me this 3rd day of October, A. D. 1890.

ROBT C. GEORGI,
Deputy Clerk U. S. Circuit Court, S. D. O. [SEAL.]

219 And afterwards, to wit, on the 3rd day of January, A. D. 1891, the following opinion was filed in the clerk's office of said court, clothed in the words and figures following, to wit:

Opinion of Judge Sage.

Circuit Court of the United States, Southern District of Ohio, Western Division.

C. & A. POTTS & CO. }
vs. } In Equity.
FRANK F. CREAGER *et al.* }

This suit is for the infringement of claim 6 of patent No. 322,393, July 14, 1885, and claims 1 and 2 of patent No. 368,898, August 23, 1887, both issued to C. & A. Potts for improvements in disintegrating clay. The purpose of these improvements was to disintegrate clay by means of a revolving cylinder, against which the clay was automatically pressed, as hereinafter described. The machine consists of a cylinder mounted on a shaft having suitable bearings on the frame which supports it, the cylinder being of such length as to nearly fill the space between the sides of the frame. A series of steel bars is fitted into longitudinal grooves in the periphery of the cylinder, where they are held by flush screws at each end or other suitable means, that they may be so adjusted as to present a sharp corner projecting above the surface of the cylinder. Opposite the cylinder a strong plate is mounted on the shaft, so as to swing in bearings on the frame. The central part of this plate is cylindrical in outline, the upper portion presenting a straight surface and the lower portion presenting to the cylinder a curved surface corresponding to the periphery of the cylinder. This plate is caused to oscillate in its bearing by means of an eccentric wheel.

The opposed sides of the cylinder and the upper and central portions of the plate form, together with sheet-metal end plates,
220 which are secured to the frame, a trough, one side of which approaches and recedes from the other at intervals, and which has at the bottom a narrow opening of constant width.

The operation of the machine is as follows:

The upper end of the plate being swung back to the position farthest from the cylinder, the moist, untempered clay is thrown into the trough above mentioned. The cylinder revolving rapidly, successive portions are removed from the mass of clay and carried through the opening between the plate and the cylinder by the scraping bars. At the same time the upper portion of the plate moves slowly toward the cylinder, thus keeping the mass of clay in close contact with the cylinder as successive portions are removed. The finely divided clay, after passing through the opening between

the plate and the cylinder, falls upon the lower curved portion of the plate, and from thence to an incline, which carries it away.

Claim 6 is as follows:

"In a clay-disintegrator, the combination, with cylinder A, having a series of longitudinal grooves, of the scraping bars *c*, adjustably secured in said grooves, for the purpose specified."

In patent No. 368,898 a plain cylinder set oppositely to the cutting cylinder and revolving therewith in close proximity, so that the raw clay may be fed, shredded, and discharged in an even and continuous manner in readiness to be taken directly to the pug or other mill, is substituted for the swinging plate described in patent No. 322,336. This additional cylinder serves as a feeder, continuously pressing the clay toward the shredding cylinder, whereby an abutment is furnished for the shredding cylinder to act upon, which,

while being unyielding and unchanging as to location, is at
221 the same time continuously changing as to surface, distributing the wear evenly throughout the circumference of the periphery of the feed-cylinder, and thus not operating to change or vary the width of the space between the two cylinders as rapidly as had resulted from the wear upon the plate in the old construction. The two cylinders being arranged in such a manner as to be adjusted toward or from each other, it is only necessary, when the feed-cylinder becomes worn to such an extent as to render the space between the cylinders too wide for practical use, to adjust them until the space is reduced to the width desired, thus enabling the cylinder to be used for a long time, the wear upon its surface not resulting in changing the character of the abutment, as has been the case in the old construction, wherein the abutting portion of the plate would soon be worn into a flat condition not suitable for practical use, requiring the substitution of a new one at considerable expense. The improved construction also obviated the objection of the clay sticking to the feeding device, the feeding cylinder being continuously rotated in one direction.

Claims 1 and 2 of this patent are as follows:

"1. In the supporting frame of a clay-disintegrator, a rotating cylinder longitudinally grooved and carrying cutting bars in and projecting beyond the grooves, in combination with a smooth-faced rotating cylinder adapted to carry and hold the clay against the cylinder having the cutting bars thereon, which latter cut or shred the clay and pass the same between the cylinders, substantially as set forth."

"2. In clay-disintegrators, the combination, with the main supporting frame and with the rotating cylinder fixed therein and having longitudinal cutting bars projecting beyond the face thereof,

of a positive revolving companion cylinder fixed opposite
222 thereto in said frame and having a smooth face or surface, with which said cutting bars directly co-operate to shred or clip the clay as the same is fed by and passed between said cylinders, substantially as described."

The defences are, to the first patent, anticipation and want of novelty; to the second patent, anticipation, want of invention, and non-infringement.

Respondents rely upon eight prior patents. The first of these is the Butterworth patent of 1865 for an apple-grinding machine or cider mill, in which is employed a cylinder having its periphery armed with knives or cutters having serrated or toothed edges, which form a series of cutting projections with chisel-shaped edges. These cutters are so adjusted as to project beyond the periphery of the cylinder.

Second. The Ennis patent, September, 1865, for a machine for preparing paper pulp, in which an engine roll is found having on its periphery a series of cutters set in grooves in the periphery of a cylinder so as to be in close proximity one to the other.

Third. The Frost patent, April 3, 1866, for an improved construction of paper-engine or pulping-machine cylinders, which consists in so applying the grinding plates or knives that they may be moved outwardly from the circumference of the cylinder as they wear under the operation of grinding the pulp, provision being made to hold them firmly in position as adjusted.

Fourth. The Van Name patent, January 8, 1884, which shows a construction of the peripherical surface of a roller for grinding mills with alternating blades of hard and soft material, arranged in grooves around the surface and parallel with the axis. The blades or cutting knives can be renewed from time to time, but no provision is made for adjusting the projection of their edges
223 from the projection of their edges from the cylinder.

Fifth. The Peabody patent for a cotton-seed huller, showing a revolving cylinder, around the periphery of which, at equal distances apart, are arranged knives, each having a chisel-shaped cutting edge and adjustable for the purpose of increasing or diminishing the cut.

Sixth. The Mayfield patent, January 10, 1871, for grinding mills. The knives of the cutting cylinder are arranged tangentially; the cylinder is longitudinally grooved, and these grooves extend entirely through the rim of the cylinder, forming slots therein; the knives project inwardly through these slots and are adjustably bolted inside the cylinder, the cutting edges of the knives projecting outwardly from the cylinder; these bolts engage in the knives so as to permit the adjustment of the projection. The Mayfields call their knives "plane bits," half the knives having smooth, sharp edges, the other half corrugated ones.

Seventh. The Smith patent for an apparatus for preparing wheat for grinding, employing a cylinder similar to the cylinder of the Mayfield patent, with a series of plane bits projecting from its periphery. These plane bits or knives are adjustably bolted by screws and slot- within the cylinder, while their cutting edges project through slot- *within the cylinder, while their cutting edges project through slots* outwardly through the rim of the cylinder. The cylinder, however, instead of having the slots and knives its entire length has the long knives made up of separate-length sections, each knife being about half the length of the cylinder.

Eighth. The Rudy patent, March 9, 1875, for clay-pulverizer,

provided with solid fluted reducing cylinders, the grooves
224 being either fine or coarse, and a single reducing cylinder acting against the clay as it rests in concave plate springs, after which it falls through a sieve and descends to a second cylinder, and then to a third.

The respondent also relies upon the cylinder shown in model of Creager's wood-polishing machine as an anticipation. This is a cylinder or roller, provided on its periphery with series of projecting strips of glass, not different materially in form from the complainant's scrapers, and, like them, fitted into longitudinal grooves in the periphery of the cylinder.

It appears from the testimony for the respondents that a machine constructed like the model which is in evidence was in successful operation on Canal street, in this city, in 1874. It was used for polishing or "slicking" boards, which were run between the cylinder and a support and pressure roller journaled underneath and connected with an automatic adjustable contrivance.

On behalf of the complainant it is said that the Butterworth machine could not perform the work of the complainant's machine, for the reason that it operates against a yielding surface and that the cylinder, if removed from a cider mill and placed in a clay-disintegrator, would not perform the office nor produce the result of complainant's cylinder because of the sticky, adhesive condition of clay generally used in making brick, and that the knives with their chisel-shaped edges, while fitted to perform the work of a cider mill, would not be suited to the shredding of clay contemplated in complainant's machine. Suppose all this be granted, the question remains, Is there any patentable difference? The strips of glass in the cylinder of Creager's wood-polishing machine are
225 substantially of the shape of the steel scrapers in complainant's cylinder. "But," says the complainant's expert, "they are glass; they never would do our work. Our scrapers are steel." Exactly; but is the substitution of steel for glass, or, putting that aside, the substitution of steel scrapers for steel chisel-edged knives, in adapting an old device for a new use, invention?

As to the substitution of steel for glass, the authorities from Hotchkiss *v.* Greenwood, 11 Howard, 24, down, including Hicks *v.* Kelsey, 18 Wallace, 670; Terhune *v.* Phillips, 99 U. S., 592; Gardner *v.* Herz, 118 U. S., 192, and Brown *v.* District of Columbia, 130 U. S., 87, settle it that that is not invention. As to the adaptation of a new use of what is to be found in the prior patents put in evidence by the defendants, the case of Aron *v.* Manhatten, 132 U. S., 90, is a strong authority against the complainants. The Supreme Court adopt and concur in the statement of the law by Judge Wallace in the court below as follows:

"It rarely happens that old instrumentalities are so perfectly adapted for a use for which they were not originally intended as not to require any alteration or modification. If these changes involve only the exercise of ordinary mechanical skill, they do not sanction the patent, and on most of the adjudged cases where it has been held that the application of old devices to a new use was

not patentable there were changes of form, proportion, or organization of this character which were necessary to accommodate them to the new occasion."

Now, as to complainant's patent No. 368,898, every part of the combination there claimed is old. The rotating cylinder longitudinally grooved and carrying cutting bars in and projecting beyond the grooves and the smooth-faced rotating cylinder
226 employed as a feeder are all found in the prior patents in evidence. Adjustably securing the scraping bars in the grooves is not claimed. If it were, that, too, is old; but the specification provides that the bars, instead of being replaceable, may be cast in pieces with the cylinder. There is nothing, in fact, new excepting the substitution of steel bars for the glass projections on the Creager wood-polishing machines already referred to.

But counsel urge that the complainant's machine accomplishes a new result beyond the reach of any of the prior machines and that not one of the cylinders shown in anticipation will serve the purpose of disintegrating clay, all which may for the sake of the argument be admitted, and they cite cases to sustain their proposition that prior devices do not anticipate a patent unless they operate in substantially the same way to produce the same result. The cases cited support the conclusions reached therein upon the facts presented, but the claim that novelty and utility are conclusive of invention is, as a general proposition, misleading. They may be persuasive, and in some cases they are well-nigh conclusive, but it must be remembered that without both novelty and utility the question between invention and skill cannot arise, and that is the question presented in this case. Every year, with the constant advance of skill in all the useful arts, novelty of construction is and ought to be less and less significant as an indication of invention.

If any authority be necessary in addition to cases already cited, it may be found in very recent decisions by the Supreme Court of the United States. See Butler *et al. v.* Stocked, 53 O. G., 1090, Nov. 3, 1890. That case was upon a patent for an improvement in
227 bretzel-cutters, being an improvement in moulds or dies for stamping or cutting out bretzels. The patent was held invalid by Judge Blodgett, who says in his opinion, which is quoted with approval by the Supreme Court:

"It is true, I doubt not, that it required considerable mechanical skill to make a die which would cut out a bretzel from dough so as to imitate a hand-made bretzel, because the hand-made bretzel is somewhat clumsily shaped, as the parts are bent, twisted, and laid upon each other, and it was undoubtedly a matter requiring some study, effort, and experiment to make the shape of the die correspond with the external formation of the bretzel. This, however, seems to me not to involve invention, but mere mechanical skill. The cutter might be compelled to experiment some—that is, cut several dies — but that is not invention. The proof also shows that a large number of persons before these patentees had attempted to make a machine which would cut bretzels, and considerable money

and time seems to have been expended in efforts to produce such a machine, but the noticeable thing in regard to all these early efforts was the fact that most of those engaged in them were trying to draw out and twist the dough by machinery rather than to cut or stamp dough from a flat sheet, while others were endeavoring to cut them with dies set in revolving cylinders, and as soon as the idea of cutting the dough from a flat sheet was conceived the difficulty seems to have vanished and success followed the effort, as the only change made was to adapt the old letter dies to the shape of a bretzel."

Justice Blatchford, speaking for the court and calling attention to the language of the decision below, that most of the prior unsuccessful attempts to make a machine to cut bretzels were "in trying to draw out and twist the dough by machinery, rather than
228 to cut out the form of a bretzel by a single die from a flat sheet, or else were endeavoring to cut bretzels with dies set in revolving cylinders," adds:

"It also appears that those efforts were largely made in attempts to cut out the bretzel by two opposite dies, and that as soon as the idea occurred of cutting the dough by a single die from a flat sheet success came at once by merely changing the shape of the old single die. It also appears, as suggested by the circuit court, that there was a prejudice against machine-made bretzels."

See also Florsheim *v.* Schilling, 53 O. G., 1737, Nov. 10, 1890, and County of Fond du Lac *v.* May, 53 O. G., 1884, Dec. 15, 1890.

These cases strongly support the conclusion of the court in this case that the bill must be dismissed with costs, and it is accordingly so ordered.

GEO. R. SAGE,
U. S. District Judge.

Jan. 3, 1891.

C. & E. W. Bradford, Indianapolis, Ind., for complainants: Jas. Moore, Cincinnati, O., for respondents.

229 And afterwards, to wit, on the 3rd day of January, A. D. 1891, an entry was made upon the journal of said court clothed in the words and figures following, to wit:

Journal Z, p. 261.

And now, this cause coming on to be finally heard upon the pleadings, proofs, and arguments of counsel, oral and printed, the court doth find that there is no equity in the bill of complaint, and therefore orders and decrees that the same be, and it is hereby, dismissed at complainants' costs, for the collection of which execution is awarded in the same manner as in an action at law.

Whereupon complainants prayed an appeal to the Supreme Court of the United States, which is granted, and bond fixed at $500.00.

And afterwards, to wit, on the 28th day of January, A. D. 1891, the following appeal bond was filed in the clerk's office of said court, clothed in the words and figures following, to wit:

Appeal Bond.

Circuit Court of the United States, Southern District of Ohio, Western Division, *ss.*

C. & A. Potts & Co. }
vs.
Frank F. Creager *et al.* }

Know all men by these presents that we, C. and A. Potts & Co., as principals, and Edmond K. Stallo, as surety, are held and
230 firmly bound unto Frank F. Creager, Harry M. Creager, and Jonathan Creager in the sum of five thousand dollars, to be paid to the said Frank Creager *et al.*, their executors or administrators; to which payment, well and truly to be made, we bind ourselves and each of us, jointly and severally, and our and each of our heirs, executors, and administrators, firmly by these presents.

Sealed with our seals. Dated this 28th day of January, 1891.

Whereas the above-named C. and A. Potts & Co. have taken out an appeal to the Supreme Court of the United States of America to reverse the decree rendered in the above-entitled action by the circuit court of the United States for the southern district of Ohio:

Now, therefore, the condition of this obligation is such that if the above-named C. & A. Potts & Co. shall prosecute their said appeal to effect and answer all costs if they shall fail to make good their plea, then this obligation to be void; otherwise to remain in full force and virtue.

EDMUND K. STALLO. [SEAL.]

Sealed and delivered in presence of—
ROBT C. GEORGI.

The above security is approved.

GEO. R. SAGE,
District Judge of the United States, S. D. Ohio.

231 The United States of America, }
Southern District of Ohio, Western Division, } *ss.:*

I, Benjamin R. Cowen, clerk of the circuit court of the United States within and for the division and district aforesaid, do hereby certify that the foregoing is a full, true, and complete transcript of the proceedings had by and before said court as the same appears of record and on file in said court.

Seal of the Circuit Court, South'n Dist. of Ohio.

In testimony whereof I have hereunto set my hand and affixed the seal of said court, at the city of Cincinnati, O., this 30th day of January, A. D. 1891.

B. R. COWEN, *Clerk.*
By JANIE U. COWEN, *Deputy.*

O K.
J. W. F. C.

Endorsed on cover: Case No. 14,498. S. Ohio C. C. U. S. No. 394. C. & A. Potts & Co., appellant, *vs.* Frank F. Creager, Harry M. Creager, & Jonathan Creager. Filed February 27, 1891.

151-597

STIPULATION AND ADDITION TO RECORD.

SUPREME COURT OF THE UNITED STATES.

OCTOBER TERM, 1893.

No. ~~884~~. 94

C. & A. POTTS & CO., APPELLANT,

vs.

FRANK F. CREAGER, HARRY M. CREAGER, AND JONATHAN CREAGER.

APPEAL FROM THE CIRCUIT COURT OF THE UNITED STATES FOR THE SOUTHERN DISTRICT OF OHIO.

FILED MARCH 19, 1894.

(14,498.)

(14,498.)

SUPREME COURT OF THE UNITED STATES.

OCTOBER TERM, 1893.

No. 394.

C. & A. POTTS & CO., APPELLANT,

vs.

FRANK F. CREAGER, HARRY M. CREAGER, AND JONATHAN CREAGER.

APPEAL FROM THE CIRCUIT COURT OF THE UNITED STATES FOR THE SOUTHERN DISTRICT OF OHIO.

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Frost Patent—Letters patent No. 53598, granted Clinton T. Frost April 3, 1866	14	11
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JUDD & DETWEILER, PRINTERS, WASHINGTON, D. C., MARCH 28, 1894.

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Voelk Patent—Letters patent No. 231,512, Granted Andrew Voelk August 24, 1880	42	27
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Alexander Patent—Letters patent No. 125,130, granted Abram Alexander, assignor, &c., April 2, 1872	60	39
Fletcher Patent—Letters patent No. 116,039, granted Moore R. Fletcher June 20, 1871	64	42
Wells Patent—Letters patent No. 52472, granted T. J. Wells February 6, 1866	67	44
Case Patent—Letters patent No. 297,744, granted John M. Case, assignor, &c., April 29, 1884	72	49
Alsip and Drake Patent—Letters patent No. 320,905, granted Frank Alsip and Chester T. Drake June 30, 1885	77	52
Creager Patent—Letters patent No. 207,717, granted Jonathan Creager Sept. 3, 1878	82	56
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complainant's Exhibit "F."

THE "20th CENTURY" CLAY DISINTEGRATOR.

Built in sizes to prepare Clay for from 3,000 to 6,000 Brick per hour.

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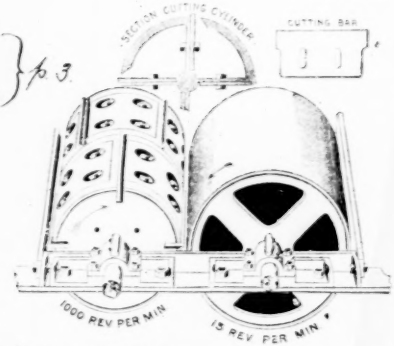
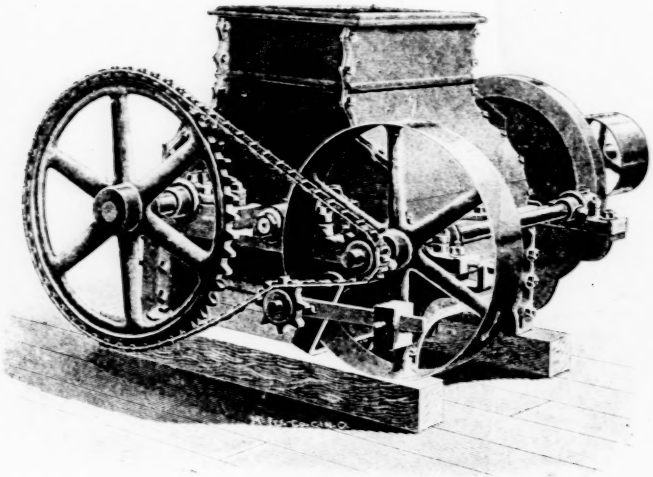
} p. 3.



Sectional drawing showing cutting bars and relative speed of cutting head and feed roll.



Patented March 27th, and July 3d, 1888.

No. 1 will prepare Clay for 3,000 Brick per hour.

1 In the Supreme Court of the United States, Oct. Term, 1893.

C. & A. Potts & Co., Appellant-,
v.
Frank F. Creager *et al.* } No. 394.

Appeal from the circuit court for the southern district of Ohio.

It is hereby stipulated and agreed by and between counsel for the respective parties hereto that the supplemental transcript of record hereto attached may be printed and used in the further procedure in this cause with the same force and effect as if it had formed a part of the original transcript; and, further, that the clerk of the Supreme Court may correct the drawing between pages 26 and 27 of the printed transcript in accordance with the clerk's certificate at the end of said supplemental transcript.

ERNEST W. BRADFORD,
Counsel for Appellant-.
JAMES MOORE,
Counsel for Appellees.

Cincinnati, Ohio, March 16, 1894.

2 The United States Circuit Court, Southern District of Ohio, Western Division.

C. & A. Potts & Co., Complainants,
vs.
Frank F. Creager, Harry M. Creager, and Jonathan Creager, Respondents. } = 4244. In Equity.

Supplemental Transcript.

3 Complainants' Exhibit "F."

(Here follows diagram marked p. 3.)

4 Brick-making on a Sure Basis.

The "20th Century" Clay Disintegrators.

In calling your attention to our new disintegrator we submit a machine designed and constructed on strictly scientific principles. The heads containing the cutting bars are made in two sections of four chambers each, receiving air at the ends, which, working in connection with the throat openings directly under cutting bars prevents any clay either wet or dry from lodging there, the centrifugal force throwing all clay from the cutters which by always presenting a clean corner the amount of power required is greatly reduced, for it is not the cutting that consumes so much power, but

the clogging. The cutting bars are made of good steel, and when necessary are quickly and conveniently set out and held in position by positive backing, each cutter sets on a shear, the bars of the two sections being set alternate. One set of bars should run an entire season. New cutters can be obtained at any time and at small expense. These machines run almost noiseless and with as little wear as it is possible to run a machine at a high speed. Unlike the ordinary roller process, the action of the disintegrator is to remove small portions by cutting from the clay fed into the hopper on the same principle as shaving or whittling and does not roll the clay into sheets, thus making it unfit for proper manipulation. The past season we have put out many of these machines in difficult clays, and made it an obligation to work the clay both wet and dry, and each machine has done its work well and to the entire satisfaction of the purchasers. We guarantee each machine sold to do all, and just what we claim for it and are willing to sell on such terms as are fair to both parties. In asking information of disintegrators, please state the nature of the clay to be worked, and the capacity desired, when we can give a prompt and intelligent reply. By use of the disintegrator no lumps go into the pug mill or brick machine, and all stones are either separated or thoroughly ground. The action of the machine on stones is—if it be a round hard stone it will play on the cylinders until it receives a stroke of the bars that throws it out of the hopper—if the stone is one having corners, it will be caught by the bars and ground up. Brick or tile made of disintegrated clay are more uniform and better tempered than by any other mode of preparation. There being no lumps or stones to burst them, and the clay being so uniformly prepared, the faces of the brick are smooth and the shrinkage more equal. The saving in bursted brick alone will soon pay for a machine. Also by its use one man can supply clay to brick machine for as high as 40,000 bricks daily. We solicit the closest investigation and comparison assuring the public that our machines are no infringements on other designs, but are themselves covered by two different letters patent, and other applications will be made.

Style, No. 1, guaranteed capacity for 3,000 brick per hour, weight, 2,000 lbs., complete as shown in cut, F. O. B. cars at Cin., O. $250 00

Style, No. 2, guaranteed capacity for 5,000 brick per hour, weight, 3,000 lbs., F. O. B. cars at Cincinnati, O. 325 00

Special discounts on complete outfits.

We will promptly furnish estimates on disintegrators for any larger capacity. Write us.

(Here follows diagram marked p. 5.)

complainant's Exhibit "F" cont'd.

Our Clay Disintegrator Having Geared Connection.

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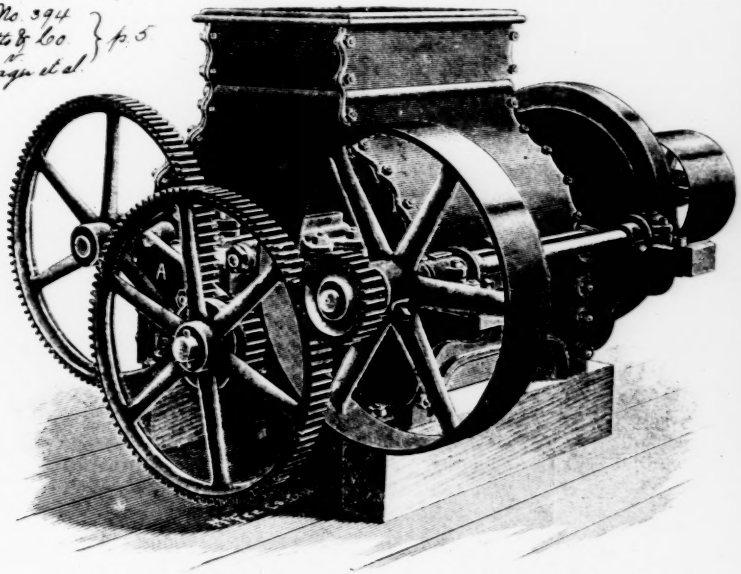
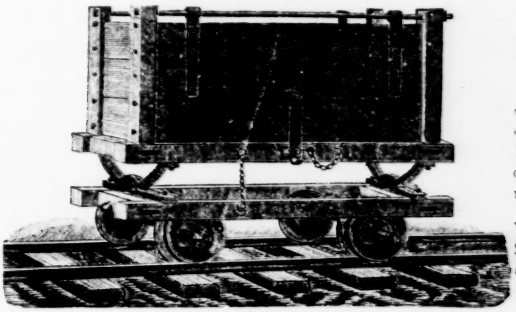
Potts & Co
v
Creager et al } p. 5



Without noise and the least possible wear we gear from 1000 revolutions of the cutting head down to 10 on the feed roll. The arm, *A*, adjusting the gears to any separation of the rolls. We consider this arrangement superior to the sprocket chain, but will furnish either style desired.



DUMP CARS.

This cut shows an excellent car for hauling clay from Bank to Pug Mill, or Disintegrator, dumps on the side, but can make end dump if desired.

Wght., 800 lbs., Price, $35.00, F. O. B. Cincinnati, Ohio.

R. Butterworth.

Cider Mill.

No 49,714. Patented Sep. 5. 1865

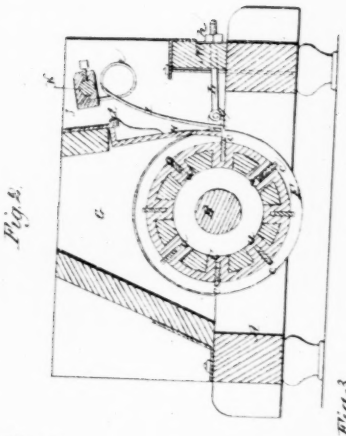


Fig 2.

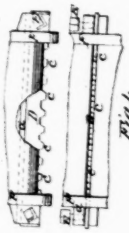


Fig 3. Fig 4.

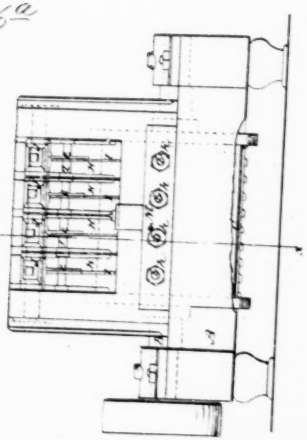


Fig 1.

No 394
Potts & Co
v.
Crouper
et al.
} p 6a

Witnesses.
Geo Tusch.
Wm Freem.

Inventor:
Robt Butterworth
per Munn & Co

6 RESPONDENTS' EXHIBIT BUTTERWOTH PATENT.

6b UNITED STATES PATENT OFFICE.

ROBERT BUTTERWORTH, of Trenton, New Jersey.

Improvement in Machines for Grinding Apples.

Specification forming part of Letters Patent No. 49714, dated September 5, 1865.

To all whom it may concern:

Be it known that I, Robert Butterworth, of Trenton, Mercer county, State of New Jersey, have invented a new and improved machine for grinding apples; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

(Here follows diagram marked p. 6*a*.)

Figure 1 is an end view of my inventioa; Fig. 2, a side sectional view of the same, taken in the line *x x*, Fig. 1; Figs. 3 and 4, detached sectional views of the grinding-cylinder.

Similar letters of reference indicate like parts.

This invention relates to a new and improved machine for grinding apples for the manufacture of cider; and it consists in a novel and improved construction of a grinding-cylinder, and also in the employment or use of a series of pressure-plates, arranged with springs in such a manner that the work may be done in an expeditious and perfect manner.

A represents what many be termed the "bed" or "framing" of the machine, on which a horizontal shaft, B, is placed, having a cylinder, C, upon it of cast-iron. This cylinder is hollow, and is cast with longitudinal boxes projecting a short distance beyond the heads of the cylinder, and having a set-screw, E, in each end of them, to secure the knives or cutters D in position. These knives or cutters are formed out of a single plate of steel, notched or cut at suitable and equal distances apart to form a series of cutting-projections, *c*, which have chisel-shaped edges, and are adjusted so as to project beyond the periphery of the cylinder C, the projections being secured in position, as previously stated, by the set-screws E. This will be fully understood by referring to Figs. 3 and 4. On each end of the cylinder C a wrought-iron band, F, is shrunk or otherwise secured, and over the cylinder a hopper, G, is placed, into which the apples to be ground or cut are placed.

H represents a series of plates which are secured to one side of the hopper G, and in fact from one side of it. These plates have a pendant position, and have joints at their upper parts, as

shown at *d*. These plates H have springs I bearing against them, which may be constructed of steel wire bent so as to have two or more convolutions, *e*, and extending down so as to press against the lower parts of the plates. The upper ends of the springs I are secured in metal heads or blocks J, which are fitted loosely on a shaft, K, the ends of which are secured in the side plates or planking of the hopper in such a manner that it will not be allowed to turn, and the heads or blocks J are secured on the shaft K by set-screw *f*. By adjusting or turning the heads or blocks J on the shaft K the springs I may be made to exert a greater or less pressure against the plates H, as desired. Each plate H has a rod, L, attached to it by a joint, *g*, and these rods pass through a bar, M, and have nuts *h* on their outer parts. By adjusting these nuts the plates H may be brought nearer to or farther from the periphery of the cylinder C, as will be fully understood by referring to Fig. 2. The plates H, it will be seen, form a sectional concave, as they are slightly curved, and each plate is allowed to yield or give to admit of hard foreign substances passing through the machine, the degree of resistance which the plates offer to such substances being regulated by adjusting the heads or blocks J on the shaft K which regulates the pressure of the springs I. When the cylinder C is rotated the apples are cut or ground by the knives between the cylinder C and the plates H, stones and other hard foreign substances forcing outward from the cylinder the plate H, with which they come in contact, so that they may pass through the machine without injuring any of its working parts, the springs I throwing the plates back to their original position as soon as the foreign substances have passed them.

The degree of fineness in which the apples are to be cut or reduced is regulated by adjusting the plates H through the medium of the nuts *h*.

The knives, when they require sharpening, may be taken out from the cutter C and reset in a short time and without any difficulty whatever.

I claim as new and desire to secure by letters patent—

6c 1. A cast-metal cylinder provided with longitudinal boxes *a*, to receive the knives or cutters D, which boxes project beyond the ends or heads of the cylinder to receive set-screws E for setting the knives or cutters and securing them in position, substantially as set forth.

2. The sectional concave, composed of plates H, provided with joints, and having springs I bearing against their lower ends and regulated by rods L and nuts *h*, substantially as described.

3. The regulating of the pressure of the spring I against the plates H by means of the heads or blocks J on the fixed shaft K and the set-screw *f*, substantially as set forth.

ROBERT BUTTERWORTH.

Witnesses:

PETER SPRACKLEN.

JOHN BUTTERWORTH, Jun.

2 Sheets—Sheet 1.

G. H. ENNIS.

Machine for Preparing Paper-Pulp.

No. 225,976 Patented Mar. 30, 1880.

No 394.
Potter & Co } p. 8
& Crager & Co.

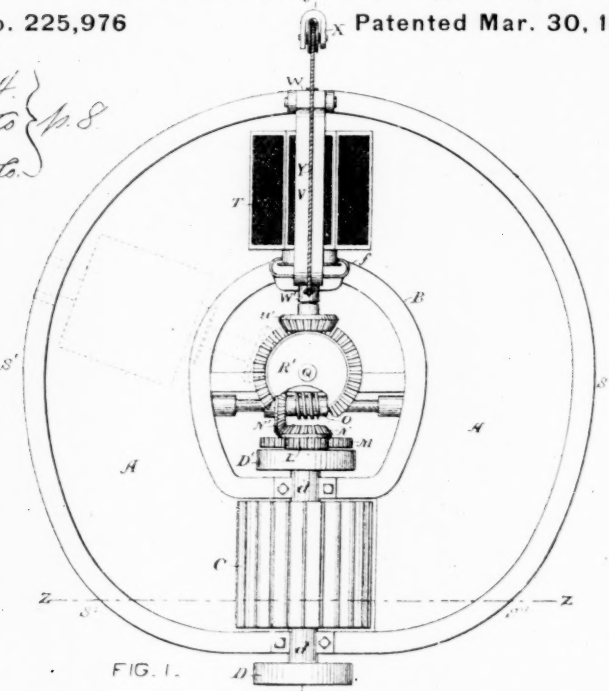


FIG. 1.

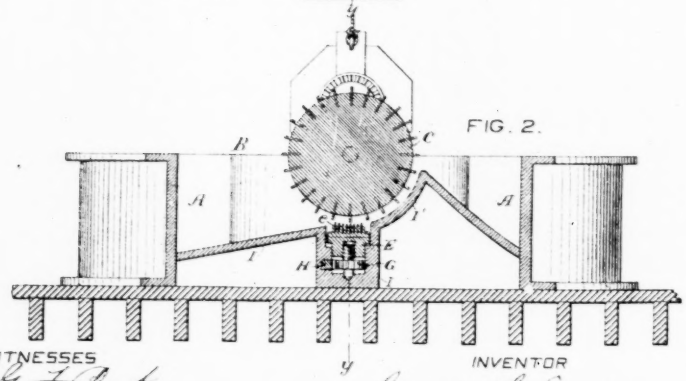


FIG. 2.

WITNESSES

J. F. Peck

J. D. Emmons

INVENTOR

George H. Ennis

2 Sheets—Sheet 2.

G. H. ENNIS.

Machine for Preparing Paper-Pulp.

No. 225,976 Patented Mar. 30, 1880.

No. 394
Potts &c
v.
Creager
et al.
p. 9.

FIG. 6.

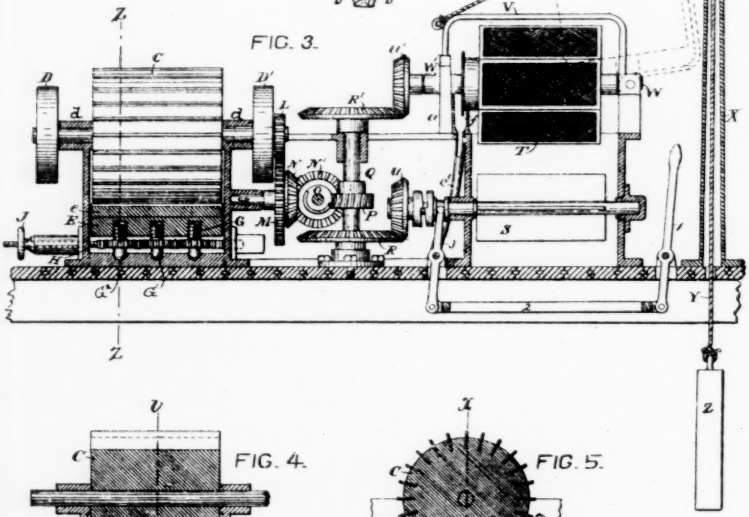


FIG. 3.

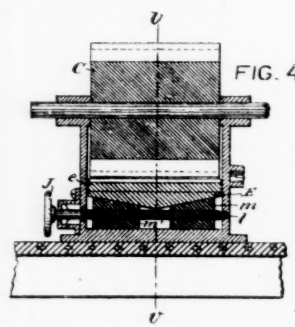


FIG. 4.

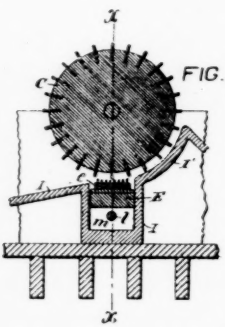


FIG. 5.

WITNESSES

G. F. Peck

J. D. Ennis

INVENTOR

George H. Ennis

7 RESPONDENTS' EXHIBIT ENNIS PATENT.

10 UNITED STATES PATENT OFFICE.

GEORGE H. ENNIS, of Troy, New York.

Machine for Preparing Paper-pulp.

Specification forming part of Letters Patent No. 225,976, dated March 30, 1880. Application filed October 9, 1879.

To all whom it may concern:

Be it known that I, George H. Ennis, of the city of Troy, State of New York, have invented a certain new and useful machine for preparing paper-pulp, of which the following specification, in connection with the accompanying drawings, embraces a full and clear description.

(Here follows diagrams marked pp. 8 & 9.)

Figure 1 is a plan view of my machine. Fig. 2 is a vertical section of one end of the same through the line x x. Fig. 3 is a longitudinal section of the same.

Like letters of reference refer to like parts in the several views.

A A, Fig. 1, is a tub or vat having one end or side straight or rectangular, while the remainder of its shape is as nearly circular in form as the termination of its curved sides in the rectangular side, avoiding rigidity of curve, will permit; or, more specifically, it consists of a semicircle and of easy curves extending from the semicircle and terminating in the straight or rectangular side, and approximating in whole somewhat to a horseshoe shape, as s' s^2 s^3 s^4, Fig. 1.

In the vat A A (having suitable back and front falls, as shown in Fig. 2) is the hollow vessel or vat B, Figs. 1 and 2, nearly conforming in its shape to the form of the exterior inclosing-vat A, the office of which is hereinafter explained.

At the rectangular end of the vat A A is placed the engine-roll C, of any suitable form of construction, the axis or shaft of which rests in suitable bearings *d d*, secured to the upper sides of the vats A A and B, as shown in Figs. 1 and 3.

Beneath the roll C is the bed-plate *e*, Figs. 2 and 3, of any suitable form of construction, inclosed in a "shoe." The latter passes through a suitable opening in the front fall, and is secured firmly, by bolts or otherwise, to the movable bed-piece E, Figs. 2 and 3.

The bed-piece E is fitted into the bed-frame I, so as to be held securely in position when elevated or depressed, by means of the male screw-threads *i i i* on the axes or shafts of the spur-gears G G' G^2, working into corresponding female screw-threads cut in the sides or walls of openings in the under side of the bed-pice E. The axes of the spur-gears G G' G^2 rest in suitable seats in the bed-frame I.

The rack H gears into the spur-gears G G' G^2, and has cut on its outer end a screw-thread, which is driven by a screw cut in the center of the hand-wheel J, acting as a nut.

It will be seen that by the action of the hand-wheel J, Fig. 3, the rack H will give a perfect and independent motion to each of the spur-gears G G' G^2, which, in their turn, by the action of the screws on the fixed nut or bed-piece E, will elevate or depress the latter, with its attached and supported shoe, and adjust the distance of the bed-plate to the roll, as may be required, insuring in this manner an even and uniform wear of both the bed-plate and roll and an economical return of the power used in driving the roll C. The number of spur-gears with threads on them, &c., will depend on the size and weight of bed-piece and its supported and attached bed-plate to be moved or variably adjusted to the roll.

The above important considerations will be the more fully understood when it is stated that in the ordinary form of paper-engine the roll shaft or spindle is stationary at the driving end, while the other end rests on a lever or "lighter-bar," by whose elevation or depression the roll is caused to approach or recede from the bed-plate, as required in the various stages of preparing the pulp. The free end of the roll-spindle describes in its elevation or depression an arc of a circle, causing the roll to rest unevenly on the bed-plate. To remedy this defect resort is commonly had to adjustable swinging bearings or swivel-boxes. The extended use of the paper-engine as thus arranged has shown that the evil above referred to is but partially remedied by this arrangement, and that the bed-plate is always worn down more on the outside than on the inner or mid-fellow side.

The following extract from Carl Hoffman's "Manufacture of Paper" will more fully present a large experience on this subject:

"Whenever the shaft is raised or lowered by the lighter it occupies a more or less inclined position, or, to speak correctly, makes a different angle with the horizontal line. If the two bearings or shells do not follow these motions, the shaft will only lie in them in one position, while in all the others it will rest on a corner of the box only. Instead of being immovable, the bearings should turn on pivots, which permit of their changing positions with the journals. It is evident that the rags can only be treated alike by the roll so long as the distance between the revolving and stationary knives is everywhere the same. When the lighter is raised or lowered, it is done with the intention of increasing or reducing that distance to a certain opening. But how can this be obtained if the two sets of knives are not parallel and the bed-plates are so set that they are not touched all across by the fly-bars when in contact with them? But this position is seldom allowed while working. The lighter-bar is always more or less raised, the shaft and fly-bars forming an angle with the bed-knives. If the length of the roll is about one-third of that of the shaft between the two bearings, and the front corners of the fly-bars are raised to about three-eighths of an inch above the plates, the back corner can only be two-eighths or one-fourth inch off; or there is always one-third

11

difference between the openings at the two ends. An engineer would laugh if he was told it did not make any difference if the fly-bars were raised one-quarter or three-eighths inch; and the plates on being removed are always worn most near the outside of the tub. If they are, for example, reduced three-eighths inch at the front side, they will only be one-quarter inch below their original height at the back end. As the plates can be worn down by the friction of the rags only, we are forced to the conclusion that the rags have been subjected to the severest action where most of the steel has disappeared—that is, on the front side; yet we allow the same pulp to be subjected to such a different treatment at all times in our engines. As the plates are wearing down, the roll follows them, and its shaft being stationary at the back end, it will descend lower at the front side than near the mid-fellow. Every paper-maker knows that."

The roll-shaft C may be driven by a pulley or gears at the front side, or by a pulley or gears in the hollow space or receptacle B, or at both ends of roll-shaft, if required, as shown in Figs. 1 and 3.

The inner end of the roll-shaft has on it a spur-gear, L, Figs. 1 and 3, gearing into the spur-gear M, Fig. 3. This latter gear, supported in a stud, has on its shaft a miter-gear, N, gearing into its companion miter-gear N′ on a shaft suitably supported. The screw or worm *o* on the shaft of the latter drives the worm-gear P on the upright shaft Q. In this manner the upright shaft Q receives a relatively slow motion in the proper direction and adaptable to the uses hereinafter described. The speed of this shaft Q is regulated by the relative diameters of the spur-gears L M, as well as the diameter of the worm-gear P.

The upright shaft Q rests upon a step at its lower end, and is held in place at its upper end by passing through a suitable bar or support secured to the sides of the vat B. The large bevel-gears R R′ upon this shaft respectively give motion to the agitator or stock-impeller S at its lower end and the washer T at its upper end.

The duty of the agitator S is various: To drive the "stuff" with greater rapidity than now under the roll, thus relieving the roll, in part, of the necessity of turning the stuff and confining the roll more particularly to its legitimate duty of grinding or reducing the stuff, and especially during the brushing of soft stocks, requiring high speed of roll, such as straw, papers, wood, &c., and the last stages of the treatment of the finished stuff, when, owing to its density or thickness, the roll has but a slight effect upon the stuff in turning it. Again, it acts to break up the various currents circulating in the engine, mixing and distributing them, (and especially when soft stocks, as papers, straw, wood pulp, &c., mixed with other heavier fiber, are under treatment,) so that the roll will act more equally and uniformly upon them and produce an evener pulp; lastly, relieving the engineer largely of his laborious duty of paddling the stuff, and, when the engine is being let down into the vats or stuff-chests, emptying the engine with rapidity.

The agitator S may be variously constructed with four or more

arms or blades radiating from a center, or it may be of a spiral form.

By the action of the levers 1, 2, and 3 on the half-clutch, in engaging and disengaging it with its fellow half-clutch, loose on the shaft of the agitator, the working of the agitator S may be suspended at the will of the engineer. The relative diameters of the bevel-gears R U′ regulate the speed of the agitator.

I am aware that propellers have already been used to facilitate the circulation of the stuff; but they have been usually placed at the surface, or but partially submerged.

The agitator above described is located at or near the bottom of the engine, where the tendency of the stock to settle and lodge is the greatest, and where the labor of the engineer in paddling the stuff is the greatest, and its use, as above explained, the more advantageous.

The washer T, of any suitable form of construction, is supported in a swinging frame, V. One end of this frame is secured in bearings W, Figs. 1 and 3, placed on the rim of the engine or other suitable support; while the inner end of the frame is free, and is tapered somewhat to fit into a socket to hold the frame V and its supported washer rigid and immovable during working.

The central power-distributing bevel-gear, B′, drives the bevel-gear pinion U′ on the washer-shaft and its secured washer, as will be seen. The speed of the washer T is mainly regulated by the respective diameters of the bevel-gears R′ and U′.

It will be seen that when the swinging frame V is rotated it will describe in its rotation an arc of a circle, and remove the
12 driven bevel-gear U from its driver R′, and the washer from the open space of the engine. The wash or dirty water passes from the washer T into the spout *f*, and thence by the pipe or conduit *c*′. The spout *c*′ is inclined at such an angle as will permit the washer T to pass it when the frame is rotated. The washer may be set at any proper depth of immersion for working.

X, Figs. 1 and 3, is a hollow column having at its top a small pulley, X′, over which latter passes a chain, rope, or wire rope. This chain is attached at one end to the inner end of the swinging frame, and, passing through the hollow column, is attached at the other end to the suspended weight Z, counterbalancing the swinging frame V and its supported washer T.

It will be seen that this manner of supporting and moving the washer permits it to be easily and rapidly thrown out of gear with its driver, assuming any angle required relative to the horizontal plane of the engine, and to be completely removed from the open space of the engine when renewals are needed to be made of its wire face, or access for repairs, &c., needed to the open space of engine.

In lieu of a column the sheaves may be secured to suitable supports over the engine, as the timbers or ceiling of a room.

The chain, by passing over proper directing-sheaves, may pass to an upper story, and thus leave the sides of the engine wholly free and accessible.

The pulley X may also have ridges in its grooves to receive the links of the chain, in order that the washer may be sustained at any required angle with the plane of the engine.

The circulo-rectangular form of engine already described largely facilitates the circulation of the stock when under treatment in the engine, and permits the advantageous and economical use of larger-sized engines than now, as will be seen, as well as an economical use of space and an easy accessibility on all sides.

The conformation of the central hollow vat, B, to the exterior inclosing-vat, A A, while aiding greatly the circulation of the stuff and acting as a mid-fellow, provides a convenient and safe receptacle for the machinery required to drive the washing and agitating apparatus and the roll-shaft, if required. Its height may be sufficient to prevent the stuff flowing over into its hollow space; or it may have a suitable cover.

The central distribution of the power driving the washing and agitating apparatus and the circular shape of a portion of the vat permit the use of as many washers and agitators as may be conveniently placed in it and used to advantage.

I have anticipated that the agitator S may be placed immediately beneath the washer T, so that its action in opening up and stirring the stock would permit the washer the more readily to remove the dirty water, &c.

I have also anticipated that the hand-wheel J may have a groove cut on it, so that a rope or chain may pass over it and over a grooved pulley suitably attached to the sides of the engine and at a convenient height, so that when motion by a hand-wheel is given to the grooved pulley the hand-wheel J will act as a nut, for the purposes already explained.

I have also anticipated that the bed-piece E, with its supported and attached bed-plate *e*, might also be variably moved, for the reasons already explained, by wedges or inclined planes *m m'*, fitted into the bed-frame I, and acting upon the inclined sides of the lower side of the bed-piece E. The screw passing the wedges *m m'* is incapable of moving lengthwise, and has cut on its ends right and left handed screw-threads.

When motion is given to the hand-wheel J, through the action of the screw *l*, the wedges will be caused to mutually advance or recede, with the effect on the bed-piece already explained, as shown in Figs. 4 and 5.

I have also anticipated that the bed-piece E may be variably moved or adjusted to the roll as required by a cylinder or roller eccentrically mounted and placed parallel with the bed-piece, and acting upon a suitably-curved surface of the under side of the bed-piece. On the axis of the eccentric roller is placed a worm-gear, which receives motion from a suitable screw and hand-wheel, producing in this manner the desired movement of the bed-piece E.

Fig. 6 represents a method of rigidly and firmly holding the swinging frame V by dogs *d d*, attached to the inner end, *a*, of the frame. When this latter descends into the space beneath the cover

or top of the vat B the dogs *d d* will engage and abut against this top and hold the frame rigid, as required.

The dogs *d d* may be disengaged by any suitable arrangement of levers.

The engine, as above described, may be supplied with the usual and necessary working accompaniments of the ordinary engine, such as cover-over roll, valves, water-cocks, sand-trap, &c., and placed in similar positions to those occupied in the ordinary engine.

The back and front falls, as well as the bed-frame, may also, for strength and solidity, be cast in one piece. (See Fig. 2.)

Having now explained the nature of my invention, what I claim, and desire to secure by letters patent, is—

1. The combination of the roll C, stationary in its bearings, with the movable bed-plate *e*, the latter secured to the rigidly-sliding bed-piece E, and capable of being moved or variably adjusted to said roll, as explained, by the action of the screws G G′ G″, or their equivalents, on the bed-piece E, all arranged and operating substantially in the manner and for the purpose set forth.

2. The vat A A, of the contour or shape $s' s^2 s^3 s^4$, in combination with the interior conforming-vat B, arranged and operating substantially in the manner and for the purpose set forth.

3. The combination of the spur-gears L M, miter-gears N N′, and screw *o*, with worm-gear P, all arranged and operating substantially in the manner and for the purpose described.

4. The combination of the bevel-gear R and pinion U with the submerged agitator S, all arranged and operating substantially in the manner and for the purpose set forth.

5. The submerged agitator S, arranged and operating substantially in the manner and for the purpose set forth.

6. The counterbalanced swinging frame V, carrying the washer T, arranged and operating substantially in the manner and for the purpose set forth.

7. The combination of the bevel-gear R′ and pinion U′ with the counterbalanced swinging frame V, all arranged and operating substantially in the manner and for the purpose set forth.

8. The placing of the submerged agitator S directly beneath the washer T, in order that the action of the agitator S in opening up the circulating stuff may assist the washer T in the removal of the dirty water, &c., as explained.

GEORGE H. ENNIS.

Witnesses:
GEO. F. PECK.
JESSIE D. ENNIS.

C. T. Frost.

Pulp Grinder.

No. 53,598. Patented Apr. 3, 1866.

Fig. 1

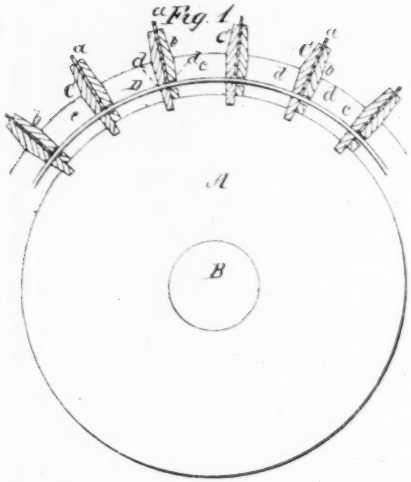


Fig. 2

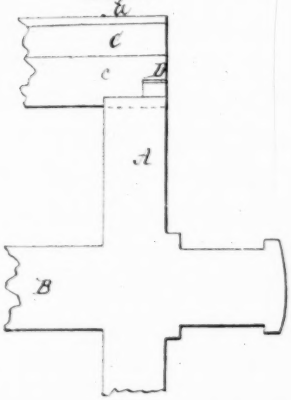


Fig. 3

Fig. 4

Fig. 5

Fig. 6

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v.
Creager
et al

p. 15

Witnesses

Horatio G. Parker

Thos. Stone

Inventor

Clinton T. Frost.

14 RESPONDENTS' EXHIBIT FROST PATENT.

16 UNITED STATES PATENT OFFICE.

CLINTON T. FROST, of Medfield, Massachusetts.

Improvement in Grinding-cylinders of Paper-engines.

Specification forming part of Letters Patent No. 53598, dated April 3, 1866.

To all whom it may concern:

Be it known that I, Clinton T. Frost, of Medfield, in the county of Norfolk and State of Massachusetts, have invented a new and useful improvement in paper-engine cylinders; and I do hereby declare the same to be fully described in the following specification, and represented in the accompanying drawings, of which—

(Here follows diagram marked p. 15.)

Figure 1 is an end elevation of a portion of a paper-engine cylinder constructed in accordance with my invention. Fig. 2 is a longitudinal section of the same. Fig. 3 is a section of a form of knife to be hereinafter explained. Figs. 4 and 5 are side views of the abutment-bars and supports, to be hereinafter explained. Fig. 6 is a section of the grinding knife or plate and its support in a modified form.

My invention is an improved construction of paper-engine cylinders; and it consists in so applying the grinding plates or knives that they may be moved outwardly from the circumference of the cylinder as fast as they wear under the operation of grinding paper-pulp; and further, in so constructing them and their holding bars or supports as to maintain them firmly in position as fast as they may be moved outward.

The mode first practiced of constructing paper-engine cylinders was to prepare a cylinder of wood, into which the grinding-knives, formed as shown in Fig. 3, were inserted for about one-third their width around its periphery, and the spaces between them partly filled with wood. As these knives, which were made of iron faced with steel, wore down, in order to sharpen them they were "chipped," as it is termed, without removing them from the cylinder, the operation being a laborious one and requiring much time for its accomplishment. After these knives have been worn down a comparatively short distance, on account of the increasing thickness of their cutting-edges, they are thrown aside as useless or forged over anew. In addition, the varying distances of their cutting-edges from the base of support renders their action irregular and uncertain, and the whole cylinder must be lowered as fast as they wear.

A later mode of constructing these cylinders has been to employ,

instead of these knives, so constructed, a series of thin steel plates, sufficiently thin to always present a cutting-edge, and corrugated to obtain additional strength. These plates have been fixed stationary with the cylinder and the spaces between them filled with wood, which is cut away as fast as the steel is worn down to it. In this construction of the cylinders, also, they must be raised and lowered to accommodate them to the wear of the plates to much greater extent than in my invention, and the whole outer circumference of the cylinder gradually diminishes in size, while in mine, as before stated, only the knives are worn, and are moved outward as fast as they wear, thus always keeping their outer edges nearly in the same position with respect to their base of support.

In the drawings, A A denote two cast-iron or other metallic heads, united together by a shaft, B, running axially through them. Inserted within, and extending a short distance outwardly from the peripheries of these heads, and running longitudinally from one to the other of them, is a series of metallic bars, C C C, &c., these bars serving as abutments for the support of a series of thin steel grinding-plates, *a a a*, &c., which are placed against them and so as to extend a short distance beyond their outer edges, as shown in the drawings.

Another support or backing, *b*, is then to be placed against the opposite side of the plates *a a a*, and a key, *c*, of wood or metal, driven between the said backing *b* and the next adjacent abutment C, this serving to hold the plates securely in place against any side pressure. In practice it may be found necessary to employ two keys in place of the key *c*, but one will be probably sufficient.

The abutments C, as well as the supports *b*, are further to be retained in place by means of a metallic ring, D, inserted in notches *d*, formed in their ends, as shown in the drawings, the notch in the support *b* being larger than the ring to allow it to slide easily therein, the same being in order that after the key *c* has been removed from the cylinder the support *b* may be loosened and allow the grinding-plates *a* to be easily removed for the substitution of new ones without removing the ring D from the cylinder, as this ring does not pass through the grinding plates or knives as in all other forms of construction of cylinders.

In order to hold the plates *a* in position against any radial strain or pressure, as fast as they may be moved outward the lower edge of each plate is bent at a right angle into a short lip, *e*, which
17 rests in a groove, *f*, formed in the side of the support *b*, the said support being provided with a number of such grooves, as shown in Fig. 5. Instead of this arrangement of grooves and the lip a strip of metal may be placed under each plate *a* as fast as it is pushed outward.

I do not claim, broadly, the employment of thin steel bars in the construction of paper-engine cylinders, nor corrugating them for greater strength; neither do I claim an improved bed-plate for paper-engines, as shown in United States patent, No. 47849, and granted on the 23d day of May, 1865.

I claim—

1. The application of the grinding-plates *a* to the cylinder of paper-engines in such manner that they may be moved outwardly from its circumference and secured in position as occasion may require, as hereinbefore explained.

2. The peculiar construction and arrangement of the plate *a* and its support *b*—that is, with the lip *e* and grooves *f f*—substantially in manner and for the purpose as above described.

CLINTON T. FROST.

Witnesses:
JOHN H. HORNE.
S. FRANK HOLWAY.

18 RESPONDENTS' EXHIBIT VAN NAME PATENT.

20 UNITED STATES PATENT OFFICE.

GEORGE VAN NAME, of St. Louis, Missouri.

Roller for Grinding-mills.

Specification forming part of Letters Patent No. 291,654, dated January 8, 1884. Application filed April 26, 1883. (No model.)

To all whom it may concern:

Be it known that I, George Van Name, a citizen of the United States, residing at St. Louis, in the State of Missouri, have invented certain new and useful improvements in rollers for grinding-mills, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to improvements in rollers for grinding-mills; and it consists in the construction of the rollers, all of which will be hereinafter more fully described, and pointed out in the claim.

In the drawings accompanying and forming part of this specification—

(Here follows diagram marked p. 19.)

Figure 1 is a longitudinal section of a roller, with blades arranged in grooves around the surface, parallel with the axis. Fig. 2 is a cross-section of the roller, showing the blades of hard and soft material. Fig. 3 represents one of the blades detached. Fig. 4 is a side view of the cylinder without blades. Fig. 5 is an end view, showing the longitudinal grooves for keying the blades.

A is the shaft, on which the cylinder B is made secure. Two or more dovetailed annular grooves, *b b*, are cut around the surface of cylinder B, and four longitudinal grooves, *e f g h*, are cut slightly dovetailed in the surface of the cylinder B. Blades of hardened steel C C are formed with dovetailed tongues *c' c'*, to correspond with the grooves *b b*. There are also blades C' C', of the same form, made of any softer material—as soft iron, hardened paper, wood, &c.—to be placed alternately with the steel blades. These blades C and C' are inserted by dropping them into, or sliding them endwise in, the longitudinal grooves *e f g h*, and the dovetailed tongues are entered into grooves *b b*, and moved around the cylinder B. The surface of the roller is made up each way from these grooves, until each quadrant is full, leaving room only for four key-blades, which are dovetailed to fit the grooves *e f g h*, and driven in endwise, thus keying securely the blades in the four quadrants of the cylinder B. Should any blade or blades require removal, it will be seen that by this construction it will be but little trouble to remove it or them without disturbing either of the other sections beyond the longitudinal grooves nearest the defective blades.

(No Model.)

G. VAN NAME.

ROLLER FOR GRINDING MILLS.

No. 291,654. Patented Jan. 8, 1884.

Fig. 1.

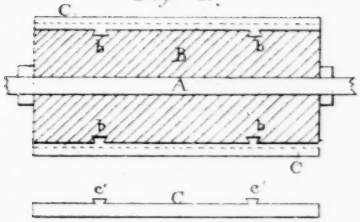

Fig. 2

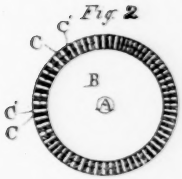

Fig. 3.

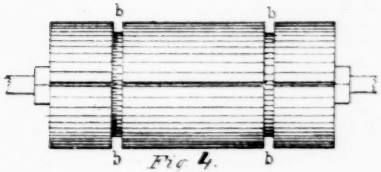

Fig. 4.

Fig. 5

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Creager
et al

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Attest
Geo. Wallace
W. E. Skaggs

Inventor.
Geo. Van Name
by Wm. R. Singleton
Atty

I am aware that rollers for grinding-mills have been constructed of alternate blades of hard and soft material, and such, broadly, I do not claim.

I claim—

A grinding-roller for mills the surface of which is composed of alternate series of thin steel blades and softer material, secured in the cylinder by dovetailed grooves in the surface of the cylinder, and keyed together by key-blades lengthwise of the roller, substantially as and for the purpose described.

In testimony whereof I affix my signature in presence of two witnesses.

GEO. VAN NAME.

Witnesses:
JOHN LOCKIE.
CHAS. S. SHREVE.

21 RESPONDENTS' EXHIBIT PEABODY PATENT.

23 UNITED STATES PATENT OFFICE.

GEORGE H. PEABODY, of New York, N. Y.

Letters Patent No. 92997, dated July 27, 1867.

Improvement in Cotton-seed Hullers.

The schedule referred to in these letters patent and making part of the same.

To all whom it may concern:

Be it known that I, George H. Peabody, of the city, county, and State of New York, have invented a new and improved machine or mill for hulling cotton-seed; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

(Here follows diagram marked p. 22.)

Figure 1 is a side elevation.

Figure 2 is a section.

The object of this invention is to utilize the waste cotton-seed, and consists of a revolving wheel or cylinder, having the periphery thereof provided with concave receptacles, in combination with adjustable and fixed knives, and the segment of a circular block, having a corrugated or serrated surface, so as to hull the seed without bruising it, and thus avoid the liability of the seed becoming rancid.

I construct my machine as follows:

A is a box, of a rectangular shape, open above and below, and having the revolving cylinder B supported on an axle, *a*, passing through the sides of the box, the axle having a balance-wheel, C, on the end thereof, provided with a handle, *b*, with which to turn the cylinder.

At equal distances apart, around the periphery of the cylinder, are arranged the adjustable knives *c*.

The knives are inserted in cuts or grooves, made so as to give them a suitable inclination forward, and are fitted tightly therein, with a sufficient space left back of the knives for the insertion of wedge-shaped pins for adjusting them, so as to increase or diminish the cutting-surface of the cylinder, as may be required; or if preferable it may be done by a set-screw, *d*, passed through a slot in the knife, the head of the screw being countersunk in the cylinder. Forward of each knife, a concavity, *e*, is made across the edge of the cylinder.

D D are the fixed knives, passed through cuts or grooves in the

G. H. PEABODY.

Cotton-Seed Huller.

No. 92,997. Patented July 27, 1869.

No. 394. Potter Co. v. Craver et al. p. 22.

Fig. 1.

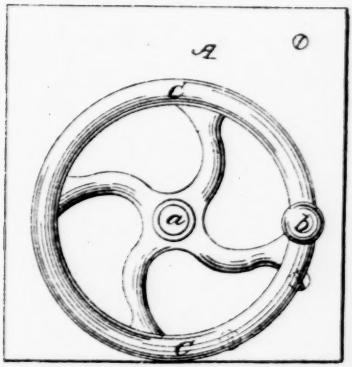
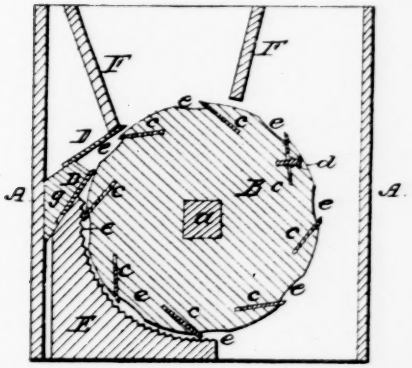


Fig. 2.



Witnesses

Jos. Burns

Hallet Kilbourn

Inventor

George H. Peabody

per G. B. Smith Atty

sides of the box, and are arranged one above the other, and in such a position as to present, with the knives of the cylinder, a proper cutting-surface to the seed.

These knives may be adjusted the same as those of the cylinder; that is, by the insertion of pins back of them, and in connection with the others may be easily removed and sharpened at any time when necessary.

The space between the fixed knives is closed by a piece, *g*, to prevent the seed falling below.

E is the block, having corrugated surface, and fastened by screws to the sides, and in the bottom forward corner of the box.

F F are pieces let into grooves in the sides of the box, forming a hopper-receptacle for the seed. Thus, by pouring the seed therein, and turning the crank of the balance-wheel, the seed will be hulled by their passing between the fixed knives and those of the cylinder, and over the corrugated surface of the block, and such seed as adhere to pieces of the shells or hulls may be separated therefrom by being shaken in a screen. But where there is an abundance of seed, as in the South, it will hardly be necessary to go to this trouble.

As it will require a less quantity of seed to feed cattle with than corn, the same quantity of seed containing more nutriment than the same quantity of corn, it will be found very desirable for the planter to economize the use of his corn, and use almost altogether the seed instead thereof.

Although there is a machine or mill, whose cylinder has a cutting-edge, yet it is so constructed in connection with the cutting-edge of its concave receptacle as to bruise the seed, and so with another machine whose cylinder has no regular knives, but projections on the periphery thereof, which, in breaking the shells, tend to bruise the seed also.

Having thus fully described my invention,

What I claim therein as new, and desire to secure by letters patent, is—

The concave receptacles *c*, in combination with the adjustable and fixed knives *e* and D D, substantially in the manner and for the purpose as herein set forth.

GEORGE H. PEABODY.

Witnesses:
DAVID A. BURR.
CHAS. C. WILSON.

24 RESPONDENTS' EXHIBIT MAYFIELD PATENT.

27 UNITED STATES PATENT OFFICE.

ISAAC MAYFIELD and WILLIAM D. MAYFIELD of Mayfield, Kentucky.

Letters Patent No. 110,927, dated January 10, 1871.

Improvement in Grinding-mills.

The schedule referred to in these letters patent and making part of the same.

To all whom it may concern:

Be it known that we, Isaac Mayfield and William D. Mayfield, of Mayfield, in the county of Graves and State of Kentucky, have invented a new and valuable improvement in grinding-mills; and we do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawing making a part of this specification, and to the letters and figures of reference marked thereon.

(Here follow diagrams marked pp. 25 & 26.)

Figure 1 of the drawing is a side view of our grinding-mill;

Figure 2 is a sectional view;

Figure 3 is a detail, showing one of the plane-bits for the grinding-wheel; and

Figure 4 is a side view, showing the removable plate C, hereinafter mentioned.

Our invention relates to portable grinding-mills, and consists in the construction and novel arrangement of devices intended to serve as valuable improvements upon such mills, and adapt them for general use among farmers.

A of the drawing represents a pyramidal frame, to the central longitudinal bars of which our grinding-wheel is affixed.

B represents the grinding-wheel, constructed as shown on Fig. 2. It is a hollow wheel, with a closed side at one end, and a removable slotted disk, C, at the other, as shown.

The rim of this wheel is constructed with a series of openings, *a*, one side of which is beveled, and the other vertical, as shown.

The letters *c* represent a series of rests or supports, arranged, in relation to the openings *a*, as shown on Fig. 2.

Upon each of the rests *c* I attach a removable knife or plane-bit, *e*, held in place and made removable by the screws *g*, which pass respectively through slots in said plane-bits.

One of these plane-bits is shown on Fig. 3 of the drawing. It has a toothed or corrugated edge.

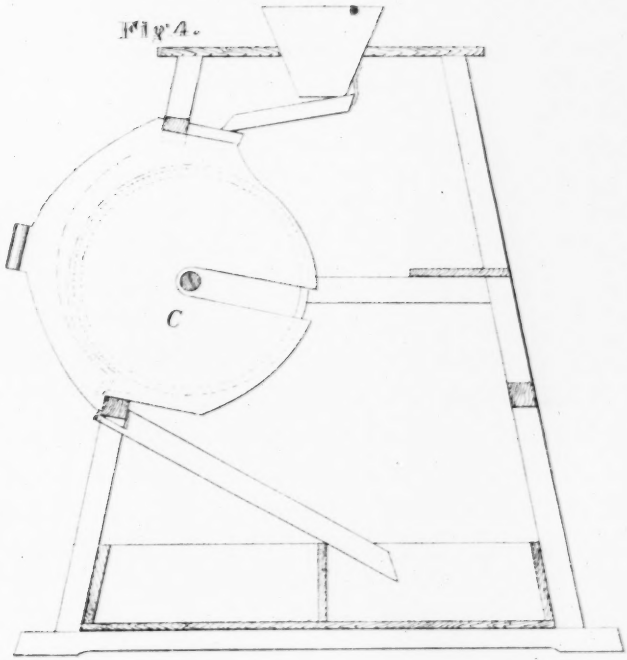
2 Sheets—Sheet 2.

I. & W. D. MAYFIELD.

Grinding Mill.

No. 110,927. Patented Jan. 10, 1871.

Fig. 4.



No 394
Potts & Co
v
Creager
et al
} p. 20

Witnesses
Wm. Anderson
Chas. Kenyon

Inventors.
I. Mayfield
W. D. Mayfield
Chipman Hosmer & Co.
Attys

2 Sheets—Sheet 1.

I. & W. D. MAYFIELD.

Grinding Mill.

No. 110,927. Patented Jan. 10, 1871.

Fig. 1.

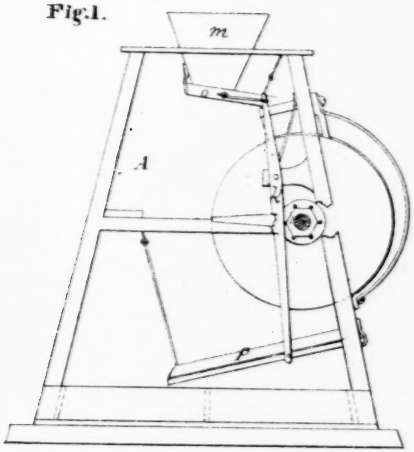


Fig 3.

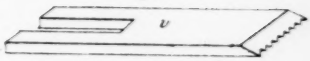
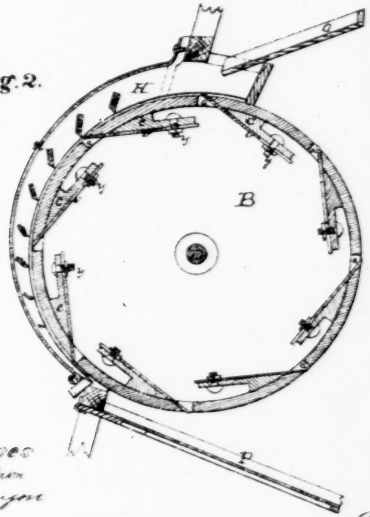


Fig. 2.



No 394
Potts & C
v
Crager
et al.
p. 26

Witnesses
Elliott Judson
Chas Kenyon

Inventor.
I. Mayfield
W. D. Mayfield
Chapman Coleman & Co
Attys

Upon the grinding-wheel each alternate plane-bit has a corrugated edge, while the others have smooth sharp edges.

The wheel B is attached to and rotates with the shaft D, in the manner represented.

The letter H represents a casing, extending about half way around the wheel B, and attached firmly to the side of the frame. It consists of two arcs connected together by bars *s*, between which bars and the rim of the wheel the grain is ground.

The letter N represents a circular plate, hinged to the casing H, and adapted to fit closely to said case when desirable.

M represents the receiving-hopper;

O, the suspended conduit to convey the grain to the wheel; and

P, the suspended sieve below the wheel.

The letter K represents a pivoted lever, one end of which is connected with the conduit O, and the other to the sieve P, in the manner shown.

That portion of the shaft D between the left-hand side of the wheel and the frame is made in a polygonal form, as shown at *h* on Fig. 1. As the shaft rotates, the shoulders of this portion of the shaft are, respectively, forced against the side of lever K, and thereby produce a constant shaking of the conduit O and the sieve P. The result is, the grain is passed to the grinding-wheel, and, after being ground, is sifted automatically.

We claim as our invention—

1. The decreasing bars S S S S, in combination with the casing H and adjustable knives *c*, attached to the hollow cylinder D, when constructed and arranged as and for the purpose specified.

2. The arrangement of the cams *h* upon the shaft D, the lever K, sieve P, and shoe O, in the manner and for the purpose set forth.

In testimony that we claim the above we have hereunto subscribed our names in the presence of two witnesses.

ISAAC MAYFIELD.
W. D. MAYFIELD.

Witnesses:
J. R. HURT.
C. R. DALLAM.

28 RESPONDENTS' EXHIBIT SMITH PATENT.

30 UNITED STATES PATENT OFFICE.

JAMES WILLARD SMITH, of New York, N. Y.

Apparatus for Preparing Wheat for Grinding.

Specification forming part of Letters Patent No. 242,387, dated May 31, 1881. Application filed March 22, 1881. (No model.)

To all whom it may concern:

Be it known that I, James Willard Smith, of the city, county, and State of New York, have invented a new and useful improvement in mechanism for preparing wheat for grinding, of which the following is a specification.

(Here follows diagram marked p. 29.)

Figure 1 is a sectional side elevation of my improved machine, taken through the line *x x*, Fig. 2. Fig. 2 is a sectional front elevation of the same, taken through the line *y y y y*, Fig. 1. Fig. 3 is an enlarged sectional view, showing the manner in which the knives operate upon the kernels.

Similar letters of reference indicate corresponding parts.

The object of this invention is to remove the dust, fuzz, and other impurities from the creases in the kernels of the wheat, and also to prevent the bran from being pulverized and mixed with the flour.

A represents a casing, of a size depending upon the amount of wheat to be operated upon at a time.

B is a revolving shaft which passes through the casing A.

To the shaft B is attached a hub, C, provided at its center with spokes or a flange, D, carrying a cylindrical shell, E, which is slotted longitudinally from its ends to the central flange or spokes, D, to receive a series of knives, F. The knives F rest against inclined lugs, brackets, or flanges G, formed upon or attached to the inner surface of the shell E at the rear sides of its knife-slots. The knives F are slotted transversely to receive the screws or bolts H, that secure the said knives to the lugs, brackets, or flanges G, so that the said knives can be moved forward as they become worn. The knives F are thus arranged like plane-irons, and their cutting-edges project beyond the outer surface of the shell E for a distance equal to about half the thickness of a kernel of wheat.

The wheat is fed into the machine through a chute, I, which passes in through an aperture in the rear wall of the casing A. The lower ends of the sides of the chute I are concaved, to fit against the end parts of the shell E.

The lower part, J, of the bottom of the chute I is curved, as shown in Fig. 1, so as gradually to approach the shell E, and upon the lower end of the said part J is formed a lip, K, which projects to a

(No Model.)

J. W. SMITH.

Apparatus for Preparing Wheat for Grinding.

No. 242,387. **Patented May 31, 1881.**

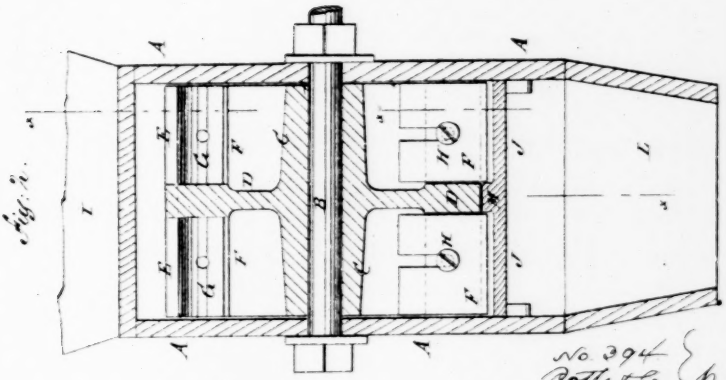


Fig. 2.

No. 394 Potts & Co v. Creager et al. p. 29

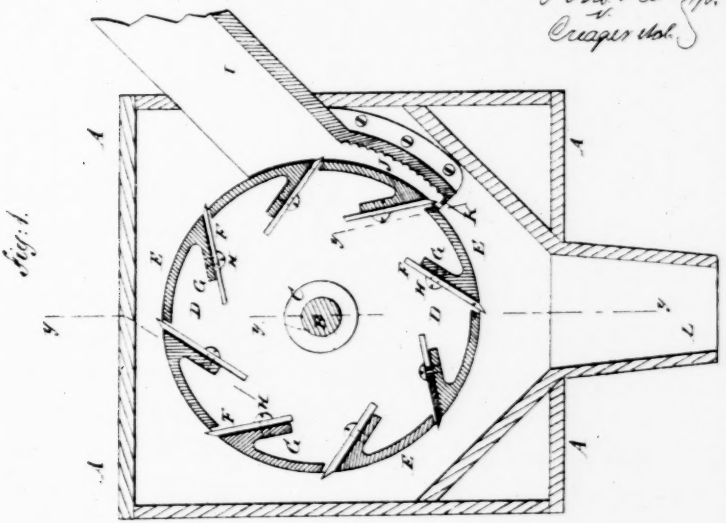


Fig. 1.

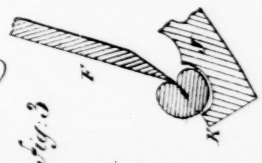


Fig. 3.

WITNESSES:

Chas. Nicka

C. Bidgurck

INVENTOR:

J. W. Smith

BY Munn & Co

ATTORNEYS.

height equal to about half the thickness of a kernel of wheat, and its top is at such a distance from the shell E that the edges of the knives F will just clear the lip K, as shown in Fig. 1.

The upper surface of the curved part of the bottom of the chute I is corrugated, as shown in Fig. 1, to cause the kernels of wheat as they roll down the chute to take a horizontal position against the lip K, so that they will be cut longitudinally by the knives F.

With this construction the kernels will be cut longitudinally in such a manner as to open the creases in the said kernels and liberate therefrom the dust and fuzz.

The split kernels escape from the machine through the discharge-spout L.

Upon the curved part of the bottom of the chute I is formed a rib, M, which is concaved to fit against the shell E opposite the spokes or flange D, and between the adjacent ends of the knives F, as shown in Fig. 2, to prevent any kernels from passing through the machine without being operated upon by the said knives F.

In applying my invention to practical use the wheat is first passed through an ordinary cleaning-machine in the same manner as for grinding. The wheat is then passed through the machine hereinbefore described, by which the kernels are cut longitudinally, so as to open the creases of the kernels. The cut grain is then passed through an ordinary brush-machine to remove the dust, fuzz, and other impurities liberated from the creases of the kernels. The cut kernels are then ground or crushed between stones or rollers to reduce them to flour.

By this process the dust, fuzz, and other impurities confined in the creases of the kernels are removed before any flour is formed. The cut kernels of wheat thus prepared are reduced to flour with less pressure and friction than when ground in the ordinary manner, and consequently the bran will not be ground or pulverized and the fine powder thus formed mixed with the flour to discolor it, so that almost the entire product of the wheat will be made into the finest quality of flour.

If desired, the cut kernels of wheat before being passed through the brush-machine may be passed through a bolt or screen
31 to take out the small quantity of seminola or sand-like flour that may have been formed by the cutting operation. The cut kernels may then, if desired, be passed a second time through the cutting-machine to reduce the pieces to a nearly uniform size.

Having thus fully described my invention, I claim as new and desire to secure by letters patent—

The combination, with a revolving cylinder, E, of the knives F, projecting therethrough, and the horizontally corrugated, concave J, having lip K at the lower end, as and for the purpose specified.

J. WILLARD SMITH.

Witnesses:
JAMES T. GRAHAM.
C. SEDGWICK.

32 RESPONDENTS' EXHIBITS RUDY PATENT.

35 UNITED STATES PATENT OFFICE.

DANIEL RUDY, of Circleville, Ohio.

Improvement in Clay Pulverizers.

Specification forming part of Letters Patent No. 160,618, dated March 9, 1875; application filed February 24, 1875.

To all whom it may concern:

Be it known that I, Daniel Rudy, of Circleville, in the county of Pickaway and State of Ohio, have invented an improvement in machines for pulverizing clay and separating therefrom the stones and other coarse materials, of which the following is a specification:

My invention consists of a pulverizing-roller, in combination with separate concave springs or an elastic bed for supporting the clay while the roller revolves therein, and in other improvements which will be more fully described hereafter.

(Here follow diagrams marked pp. 33 & 34.)

In the accompanying drawings, figure 1 is a side view of my improved machine. Fig. 2 is an end view of the same. Fig. 3 is a vertical section of my machine. Fig. 4 is a detached view of the pulverizing-rollers.

The frame A of my machine should be made strong and of suitable form and height to arrange thereon several grinding-rollers, B, and sieves C, which are vibrated by means of the rocking crank-shaft D and the connecting-rods E and F. The pulverizing-rollers B are set in motion by the power-pulley G and bands H and I, and they revolve in the clay which rests on the concave plate-springs K, which are curved to form a bed or trough, and work independent of each other, so as to allow stones to pass through without breaking or stopping the machine.

The clay is shoveled into the hopper L, or it may be dumped into the hopper from a cart, when the elevator M carries it up and discharges it into the feed-hopper N, to be brought under the action of the upper roller B, after which it falls through the upper sieve C, which is very coarse and separates only the larger stones, discharging them from the machine. The clay thus coarsely pulverized now descends to the second roller B, by which it is more finely pulverized, when the second sieve C separates the stones of a smaller size, while the finer clay passes down through the sieve to be again pulverized by the third roller B, and the third sieve C separates the gravel, which would interfere with making brick.

Being thus fully pulverized, the fine clay is now slowly discharged from the shoe O into the second elevator P, which carries the clay again to the top of the machine to be delivered into the brick-machine, which may be placed near by for that purpose.

2 Sheets--Sheet 1.

D. RUDY.

Clay-Pulverizer.

No. 160,618

Patented March 9, 1875.

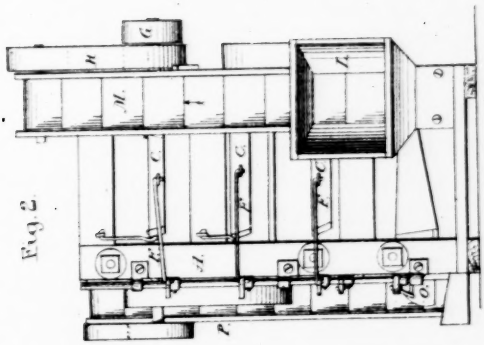


Fig. 3.

No. 394
Potts et al
Creager Hd
p. 33

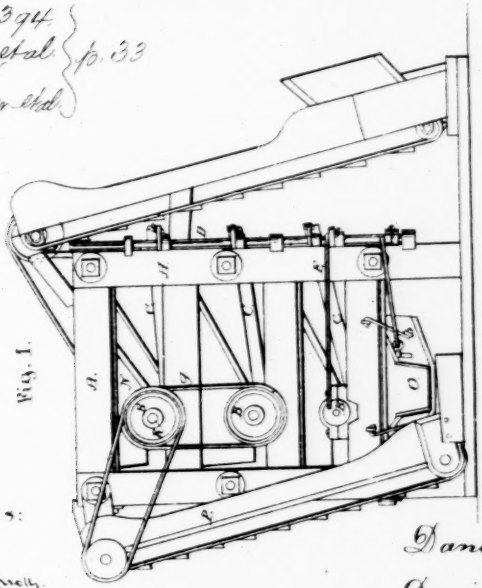


Fig. 1.

Witnesses:

Howard & Connelly
T. C. Smith

Inventor

Daniel Rudy

Per Daniel Breed

Attorneys

2 Sheets--Sheet 2.

D. RUDY.

Clay-Pulverizer.

No. 160,618

Patented March 9, 1875.

Fig. 4.

No. 394
Potts & Co
N. Creager
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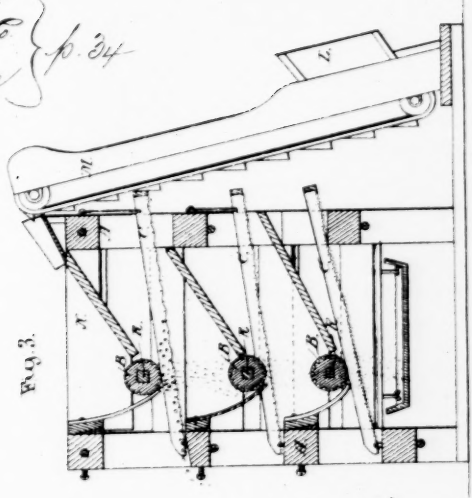
p. 34

Fig. 3.



Witnesses:

Geo. H. Graham

S. W. Boyd

Inventor

Daniel Rudy

Per: Daniel Breed

Attorney.

My pulverizing-rollers had better be cast in sections, as represented in the drawings, and then put on the shaft R, which is square, as seen in Fig. 4. By this construction I am able to use coarser or finer rollers, as may be found necessary on account of the kind of clay to be pulverized, and yet employ the same shaft R, by simply removing and replacing the sections of the rollers. A great expense is thus saved by using the same shaft.

Having thus fully described my invention, I claim—

1. The pulverizing-rollers B, in combination with springs or elastic bed for supporting the clay, substantially as set forth.

2. The series of rollers B, in combination with the sieves C, for separating successively the larger and then the smaller stones and the gravel, substantially as set forth.

DANIEL RUDY.

Witnesses:
DANIEL BREED.
THOMAS C. CONNOLLY.

36 RESPONDENTS' EXHIBIT COOK, BROMBROFFE, & BAKER PATENT.

37 [Coat of arms.]

A. D. 1874, 11th May. No. 1671.

Clay Mills.

Letters patent to EDWIN COOK, of Loughborough, in the county of Leicester, ironfounder; JAMES BOMBROFFE, of the same place, brickmaker, and THOMAS BAKER, of Syston, in the said county of Leicester, brickmaker, for the invention of "improvements in clay mills, applicable also to the reduction of other substances."

Sealed the 30th October 1874, and dated the 11th May 1874.

Provisional specification left by the said Edwin Cook, James Bombroffe, and Thomas Baker at the office of the commissioners of patents, with their petition, on the 11th May, 1874.

We, Edwin Cook, of Loughborough, in the county of Leicester, ironfounder, James Bombroffe, of the same place, brickmaker, and Thomas Baker, of Syston, in the said county of Leicester, brickmaker, do hereby declare the nature of the said invention for "improvements in clay mills, applicable also to the reduction of other substances," to be as follows:—

This invention consists in adapting to the ordinary plain or cylindrical rollers employed in pulverizing, grinding, or re-
38 ducing clay or other substance, any suitable number of iron, steel, or other metal ribs, fixed on the rollers so as to take a spiral, screw, or Archimedian course, and secured at each end by metal rings, or by screws, bolts, or their equivalents; or the rollers and ribs may be made in one casting; and we also employ in conjunction with or independently of the ribs a number of steel or iron studs or spikes fixed to or cast with the rollers, and projecting from the outer surface thereof between the ribs, the object of such arrangement being to more completely pulverize, grind, and reduce the material, and thereby produce a finer clay, with the advantage of using up waste and an economy in steam, horse, or manual power.

One or more of these rollers are employed in a mill, and although specially applicable to pulverizing clay they may be advantageously employed for the reduction of other substances.

Specification in pursuance of the conditions of the letters patent filed by the said Edwin Cook, James Bombroffe, and Thomas Baker in the Great Seal Patent Office on the 4th November, 1874.

To all to whom these presents shall come we, Edwin Cook, of Loughborough, in the county of Leicester, ironfounder; James Bombroffe, of the same place, brickmaker, and Thomas Baker, of Syston, in the said county of Leicester, brickmaker, send greeting;

Whereas her most excellent majesty Queen Victoria, by her letters patent, bearing date the eleventh day of May, in the year of our Lord one thousand eight hundred and seventy-four, in the thirty-seventh year of her reign, did, for herself, her heirs and successors, give and grant unto us, the said Edwin Cook, James Bombroffe, and Thomas Baker, her special licence that we, the said Edwin Cook, James Bombroffe, and Thomas Baker, our executors, administrators, and assigns, or such others as we, the said Edwin Cook, James Bombroffe, and Thomas Baker, our executors, administrators, and assigns, should at any time agree with, and no others, from time to time and at all times thereafter during the term therein expressed, should and lawfully might make, use, exercise, and vend, within the United Kingdom of Great Britain and Ireland, the Channel islands, and Isle of Man, an invention for "improvements in clay mills, applicable also to the reduction of other substances," upon the condition (amongst others) that we, the said Edwin Cook, James Bombroffe, and Thomas Baker, our executors or administrators, by an instrument in writing under our, or their, or one of their hands and seals, should particularly describe and ascertain the nature of the said invention, and in what manner the same was to be performed, and cause the same to be filed in the Great Seal Patent Office within six calendar months next and immediately after the date of the said letters patent.

Now know ye, that we, the said Edwin Cooke, James Bombroffe, and Thomas Baker, do hereby declare the nature of our said invention, and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:

This invention consists in adapting to the ordinary plain or cylindrical rollers employed in pulverizing, grinding, or reducing clay or other substance, any suitable number of iron, steel, or other metal ribs fixed on the rollers so as to take a spiral or Archimedean course, and secured at each end by metal rings, screw bolts, or their equivalents, such rings being level with the ribs, so that the scraper usually employed cleans all at the same time; or the rollers and ribs may be made in one casting and a number of steel or iron studs or spikes are employed, fixed to, or cast with the rollers, and projecting from the outer surface thereof between the ribs, the object of such arrangement being to more completely disaggregate, pulverize, and reduce the material, and thus produce a fine clay, with the advantage of using up waste, and with an economy in steam, horse, or manual power.

One or more of these rollers are employed in a mill, and although specially applicable to pulverizing clay they may be advantageously employed for the reduction of other substances.

(Here follows diagram marked p. 39.)

Fig. 1 of the accompanying drawings represents a roller of the description above mentioned, and to which the spiral iron or steel ribs *a* are fixed, in this case by the employment of the metal rings *b*. These rings are fixed on the ends of the cylinder or roller, and the ribs being level therewith, and between each rib a number of studs or spikes of metal are arranged and fixed in any convenient manner to the roller, the object of this combination of Archimedean ribs and stubs being the more effectual reduction of the clay.

41 Although the drawing represents the ribs as connected by metal rings to the roller we do not confine ourselves to this method, as has been previously stated; the ribs may be connected to the roller by screw bolts or other efficient means, or they may be cast in one piece with the roller.

Having thus described our invention, what we claim is, the combination with the ordinary cylindrical or plain rollers of the spiral ribs *a* fixed to the rollers by the rings *b*, or by other suitable means, and in conjunction with the metal studs or spikes arranged between each rib in the manner and for the purposes substantially as hereinbefore described.

In witness whereof, we, the said Edwin Cook, James Bombroffe, and Thomas Baker, have hereunto set our hands and seals, this second day of November, in the year of our Lord one thousand eight hundred and seventy-four.

EDWIN COOK. [L. S.]
JAMES BOMBROFFE. [L. S.]
THOMAS BAKER. [L. S.]

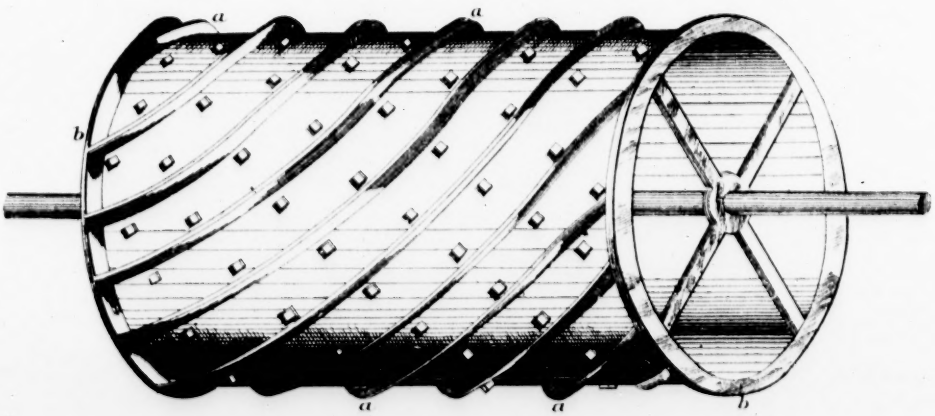
London: Printed by George Edward Eyre and William Spottiswoode, printers to the Queen's most excellent majesty. 1874.

(1 SHEET)

A.D. 1874. May 11. Nº 1671.
COOK, BOMBROFFE & BAKER'S Specification.

No 394.
Pollock & Quiggin et al } p 39

FIG. 1.



The filed drawing is not colored.

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2 Sheets—Sheet 1

A. VOELK.

Grinding Mill.

No. 231,512. Patented Aug. 24, 1880.

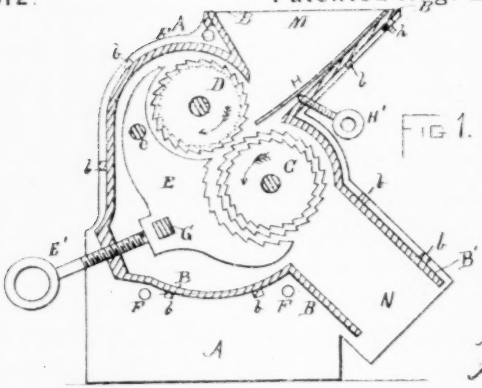

FIG. 1.

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FIG. 2

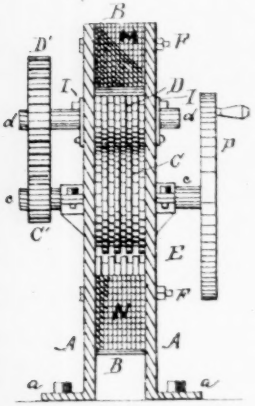
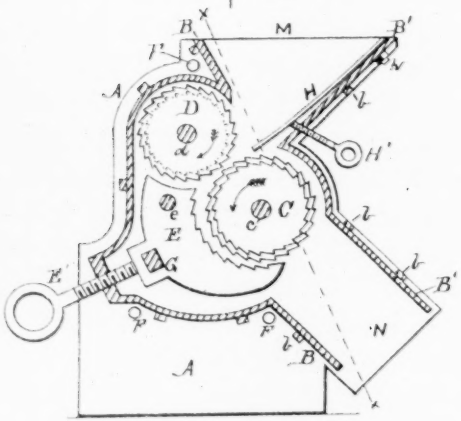


FIG. 3.



WITNESSES

Cyrus F. Dean.

D. H. Dean.

INVENTOR

Andrew Voelk

PER Jno K Hallock

ATTY

2 Sheets—Sheet 2

A. VOELK.

Grinding Mill.

No. 231,512. Patented Aug. 24, 1880.

No 394
Potts & Co.
v.
Criager
et al
p. 44

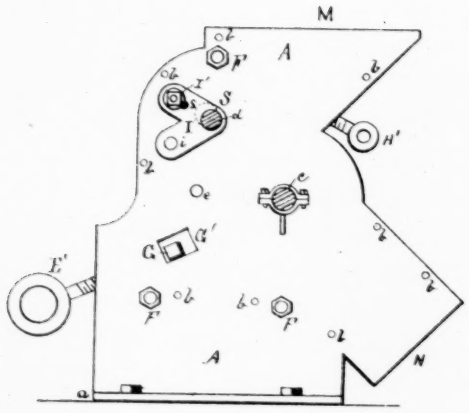


FIG. 4

WITNESSES

Cyrus F. Dean.

D. H. Dean

INVENTOR

Andrew Voelk

PER. Jno K Hallak

ATTY.

42 RESPONDENTS' EXHIBIT VOELK PATENT.

45 UNITED STATES PATENT OFFICE.

ANDREW VOELK, of Erie, Pennsylvania.

Grinding-mill.

Specification forming part of Letters Patent No. 231,512, dated August 24, 1880. Application filed February 11, 1880.

To all whom it may concern:

Be it known that I, Andrew Voelk, a citizen of the United States, residing at Erie, in the county of Erie and State of Pennsylvania, have invented certain new and useful improvements in grinding-mills; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

My invention consists in providing a new and improved grinding-mill for grinding grain, corn and cob feed, or bones, plaster, &c.

My mill is not intended to be used for grinding grain for flour, but for coarse grinding, such as oatmeal, cracked wheat, and feed for cattle and horses. It may also be used for grinding coffee and spices.

The grinding apparatus of my mill consists in two burrs and a concave grinding-surface, upon which one of the burrs operates. The same part which forms this concave also extends partly around the other burr, and therefore has the appearance of a double concave; but the second concave only serves to prevent the article being ground from following the other burr. The grinding is done between the two burrs and between one of the burrs and one of the concaves. The concave surface, however, may be omitted for some kinds of work, as the two burrs are sufficient.

The construction and operation of my device will fully appear in the following general description.

(Here follow diagrams marked pp. 43 and 44.)

The drawings represent my invention as follows: Figures 1 and 3 are side elevations of the work with the frame or case in vertical section. Fig. 2 is an end view with the frame in section on the line *x x* in Fig. 3, the works being in elevation. Fig. 4 is a plane side elevation with the gearing removed.

A A are the side plates of the frame or case, and B B′ are webs connecting the side plates and forming the remainder of the case. These webs are so formed as to leave openings M and N, of which the former is for the admission of the material to be ground and the

latter is for the discharge of the same when ground. These webs may be separate pieces, or they may be cast with one of the side plates. They are provided with lugs *b b b b*, &c., which pass through openings in the side plates; or the side plates may be provided with internal flanges or grooves to receive the webs. The frame or case is secured together by bolts and nuts F F F, &c., as many as may be desired. The side plates afford bearings for the journals of the works.

C and D are the burrs, and E the concave grinding-surface, and *c* and *d* are respectively the shafts of the burrs C and D.

P is the driving-wheel, and is shown on the shaft *c*; but it may be on a counter-shaft, from which gearing will connect it to the shaft *c*.

C′ and D′ are spur-gears on their respective shafts *c* and *d*, of which C′ is the minor, and D′ the major, gear, so that the burr D will move much slower than the burr C. The burrs move in the direction indicated by arrows thereon—that is to say, they move toward each other and from the opening M. The burrs are made with their faces toothed like a saw, and preferably of a series of plates of saw-steel toothed like a saw, and of each series of plates half are of one diameter and the other half of a less diameter, and these are arranged alternately on the shaft or arbor and secured firmly together. The alternate arrangement of these series is the reverse in one burr from what it is in the other, so that the plates of greatest diameter in the adjoining burrs will break joint—that is to say, a plate of greatest diameter in one burr will come opposite a plate of less diameter in the other burr. The teeth of the burr C point in the direction of its motion, and the teeth of the burr D point in a direction opposite to its motion; hence, while the two burrs run in the same direction, their teeth are opposed to each other, and as one will run so as to make a number of revolutions—say four or five—while the other makes one, the result is, that while the article being ground is continually drawn into the mill, it is more or less ground while passing between the rolls or burrs, and if the burrs are set close together the grinding will be quite fine, and for some articles all that will be required.

46 The bearing of the shaft *d* is movable, so as to permit the burr D being adjusted near or removed from the burr C. This is accomplished by having the shaft *d* pass through a slot, S, (shown in dotted lines in Fig. 1,) in the side plate, and an adjustable journal-bearing, I, which is pivoted at one end, as at *i*, and has a slot, *s*, and a binding-nut, I′, at the other end, by which means it is adjustable.

The concave E is made to conform to both burrs, and may extend more or less around the burr D, as shown in Figs. 1 and 3. If the burrs are made of plates, as above described, the concave is also so made, as shown at E, Fig. 2. The concave is pivoted on a bearing, *e*, and is adjusted from or toward the burrs by a screw, E′. It also has a bearing, G, which slides in a slot, G′, on the side plates, A. The concave serves at its upper end to prevent the article being ground from passing around with the burr D. Its lower concave or

face is toothed like the burr C, with its teeth set in opposition to the teeth of that burr. The office of this part of the concave is to assist in the work of grinding. In this respect it is not new, for there are other mills thus provided with concaves, and when two burrs have been used double concaves have been used in connection therewith.

The novelty in my concave consists in its serving as a grinding-surface under one burr and to prevent the article being ground passing under the other burr.

From the above it will be seen that I do not consider the use of two burrs as new, (see patent to H. W. Pitts, July 1, 1840, No. 1670, and to A. Lindsay, December 26, 1845, No. 4335, in which the double burrs are shown, and in the former a double concave is shown.)

The novelty in my device consists in placing these burrs with relation to the feeding or receiving opening so that one of the burrs will draw the article to be ground into the mill. The burr which does this work is the slow-moving burr, while the fast-running burr does the grinding—first, by acting against the slow burr, and, second, by acting upon the concave.

In the mouth M is an apron, H, which is adjusted by the screw H', so as to close more or less the throat or passages to the burrs. This is varied in accordance with the character of the articles to be ground—as, for example, with small grains, it is nearly closed, and with large it is opened wide.

The operation of grinding is as follows: The articles to be ground are drawn in by the burr D and carried between the two burrs, and as the two burrs turn together like rollers, and as one moves faster than the other and they are toothed in opposite directions, the process of grinding is begun while the articles are passing in between the burrs. So it will be seen that one of the offices of the burr D is to serve as a feed-roller and another office is to serve as a burr for grinding. Much of the same effect would be accomplished if the burr D were only a smooth or corrugated roller. The partially-ground matter next falls between the serrated concave and the burr C, and is there ground to the fineness required.

What I claim as new is—

1. In a grinding-mill, the combination of the following elements: A case or frame having a receiving and a discharging opening, two burrs adjusted on counter-shafts, one of which is made adjustable from and toward the other and geared to revolve toward each other from the receiving opening, a double concave having one of its concaves serrated and placed substantially as shown, to receive the partially-ground substance which has passed between said burrs and divert the same from following one of said burrs and causing it to pass between the serrated concave and the other burr, said double concave being pivoted and made adjustable from and toward the said burrs.

2. In a grinding-mill, the combination of the following elements: A case or frame having a receiving and discharging opening, two burrs adjusted on counter-shafts journaled in said frame or case, a

double concave placed with relation to said burrs substantially as shown, and having a pivot, *c*, and supported by bearings G in segmental slots G′ in the sides of said case, and adjusted toward or from said burrs by a set-screw E′, working through the back of said case.

In testimony whereof I affix my signature in presence of two witnesses.

ANDREW VOELK.

Witnesses:
JNO. K. HALLOCK.
LOUIS VOLKMAN.

W. GALE.

Straw Cutter.

No. 61,932. Patented Feb. 12, 1867.

Fig. 1

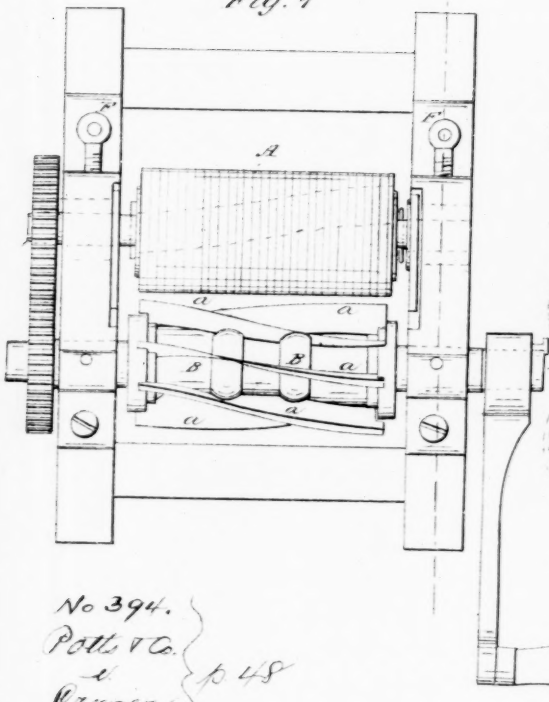
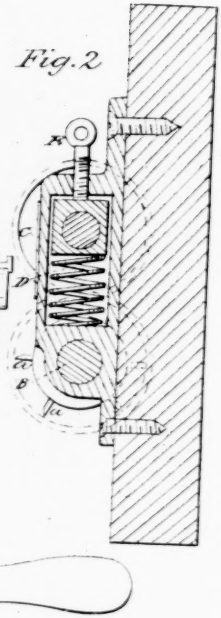


Fig. 2



No 394.
Potts & Co.
&
Crager
et al.
p 48

Witnesses:
J. H. Clayton
Jno. D. Patten

Inventor:
Lewren Gale
per Attorney
J. H. Clayton

47 RESPONDENTS' EXHIBIT GALE PATENT.

49 UNITED STATES PATENT OFFICE.

WARREN GALE, of Chicopee Falls, Massachusetts.

Letters Patent No. 61932, dated February 12, 1867.

Improvement in Straw-cutters.

The schedule referred to in these letters patent and making part of the same.

To all whom it may concern:

Be it known that I, Warren Gale, of Chicopee Falls, in the county of Hampden, and in the State of Massachusetts, have invented a certain new and useful "improvement in feed-cutters;" and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings and to the letters of reference marked thereon.

To enable others skilled in the art to make and use my invention, I will now describe its construction and operation. In the drawings—

(Here follows diagram marked p 48.)

Figure 1 is a plan view.

Figure 2 is a section in which the gearing is shown.

The nature of my invention consists in gearing together the two cylinders of an ordinary slide cylinder straw-cutter. These cylinders usually consist of a hide roller, used to cut against, and which I call the pressure cylinder A, and a cylinder armed with spiral knives, *a*, which I call the cutting cylinder B; C the sliding-box; D the spring; E the screw.

My pressure cylinder is constructed with disks of raw-hide, leather, wood, or other similar material. Each disk has a hole in its centre, and by putting a sufficient number of these disks upon a shaft we form the pressure cylinder. These disks should have sufficient material in them, so that when the cylinder which they form is worn away, so that the gearing can no longer drive the machine, we can remove the gearing and a very considerable amount of use can be obtained from the pressure cylinder in the future. Having learned from experience that none of the metals can be used without gearing, I especially exclude them in this specification. I have found by repeated trials that gearing the two cylinders together is of very great advantage in this class of cutters. When made without gearing, the pressure cylinder is driven wholly by the action of the knife edges striking against it, and this is always more or less detrimental to the knives, as well as disastrous in its effects on the pressure cylinder, for the knives strike at different places on the cylinder, scarcely ever on the same place. It follows

that each of the knives is constantly making new cuts on the cylinder, and eventually causing the machine to run hard, besides rapidly rendering the machine perfectly useless. This quick destruction of the pressure cylinder, requiring frequent and expensive repairs, is one of the most objectionable features of this class of straw-cutters. By the use of the gearing the durability of the cylinder A is increased at least five times more in using it thus, than in using it without gearing, even before cylinder A is worn down the depth of the teeth. And when the cylinder A is constructed as above described, after it is worn so that the gearing can no longer be used, it can be removed and still more use gotten out of the cylinder A. I am aware that machines of this class have heretofore been constructed with gearing; as, for example, my patent of September 12, 1854; and also in my pending application, executed in 1866. In my patent of September 12, 1854, a pressure cylinder is shown with a strip of hide to cut against. This does not anticipate my present invention, which consists in gearing a cylinder of spiral knives to a roller of full cylindrical form, constructed of disk of hide or wood. In these machines, as ordinarily constructed, in order to insure a greater durability in the hide cylinders, so as to prevent almost immediate repairs, the diameter of the pressure cylinder is generally made considerably greater than the cutting cylinder. But there result from this several disadvantages. The cost is greatly increased, the enlarged cylinder does not work so well as the small cylinder, and it does not admit of so large a body of straw to the knives as the small cylinder. When gearing is used, it is essential that the edge of the knife, and the surface of the cylinder where the knife strikes, should move at equal speed while in contact, hence the cylinder which is cut against is not generally made of a larger diameter than the cutting cylinder; consequently more than the cost of applying the gearing is saved in cost of material when the cylinder is constructed of hide. The application of gearing to this class of cutters will be useful not only in constructing new machines, but also in repairing old ones, as most any machine of this class now in use can have the gearing applied, and thereby greatly improve the machine. The wooden pressure cylinder, constructed as hereinbefore described, although it may not be in all respects equal to the raw-hide, when used with gearing, will answer a good purpose for repairing old machines now in use. The wooden cylinder and the gearing can readily be made and applied in the ordinary machine shops of the country, frequently at much less cost than the mere cost of transportation of the old machine to the factory. While the hide roller is constructed of raw-hide, prepared for this purpose expressly; is not easily obtained by country shops; is cut into form and pressed into a roller by machinery constructed for this object alone, for these reasons I recommend wooden pressure cylinders for repairs. The hide cylinder is constructed by me in the usual manner. When I use a wooden cylinder, I construct it of disks of wood about an inch thick, the grain of each disk being across the grain of its adjoining disk or disks. The disks should be firmly

secured on the shaft and well glued together, using glue not easily dissolved in water, and only the best seasoned wood. I construct the machine with the usual crank and fly-wheel, and mount it on a suitable frame. The feed or material to be cut, being placed in the box within the range or reach of the cutting and pressure cylinders, is drawn into the machine and cut off in the usual manner. The knives may be put on in any of the usual ways of so doing. When the pressure cylinder has become worn, so as to not cut well, the screws E are turned back, the gearing released, and a new adjustment made, bringing the knife in contact with the pressure cylinder in a new place.

Having thus fully described my invention, what I claim as new, and desire to secure by letters patent, is as follows:

1. The pressure cylinder A, constructed substantially as described, and geared to the cutting cylinder B, in such a manner that the edge of the knife or knives shall, at the point of contact with the pressure cylinder, move at equal speed therewith, when the said pressure cylinder is constructed of disks of wood, raw-hide, leather, or other similar material, (not including metals of any kind,) and is of full cylindrical form, substantially as set forth.

2. I claim, in combination with the above claim, sliding-box A, screws E E, spring D, operating as described and the purposes set forth.

In testimony that I claim the above-described invention, I have hereunto signed my name this 15th day of October, 1866.

WARREN GALE.

Witnesses:
S. R. KNAPP.
B. BASSETT.

51 RESPONDENTS' EXHIBIT WHITTEMORE PATENT.

53 *Specification.*

JOHN R. WHITTEMORE.

No. 33119. Aug. 20, 1861.

Be it known that I, John R. Whittemore, of Chicopee Falls, in the county of Hampden and Commonwealth of Mass., have invented certain new and useful improvements in feed-cutters, and that I do hereby declare the following is a full and exact description of the same, reference being had *to* the annexed drawing, making part of these specifications, in which the machine is represented by a side sectional view.

(Here follows diagram marked p. 52.)

In said drawing the letter A is the common hide roll for cutting against; B is the cylinder for holding the knives, usually made of iron; C, the arbor or center in hide roll; D, D, D are the knives for cutting; E, side board to the hopper; H is the spring which presses the block I against the spring board G; J, J, J is the wood frame, the cross-lines upon some parts showing where the machine is cut to show it in sections; K, the spring which keeps the hide roll from pressing too hard upon the cylinder of knives below; L is the set-screw which keeps the roll down upon the edge of the knives below, so that any feed may be cut that is brought between them; M, M, M is the iron frame which holds the roll, knives, etc.; N represents the position of the balance wheel.

The nature of my invention consists mainly in the use of common hide rolls and cylinder knives, using therewith a less number of knives than can be used with said roll and cylinder alone, and then combining with said roll and knives a compressible mouth to the hopper, the advantages of which I will hereafter describe.

The roll A is made of raw hide in the usual way, viz., it is first cut into circles with a hole in their centers and then forced upon an arbor by a powerful press until they are solid, and then held firm at each end, and when trimmed off in a lathe a smooth, hard surface is left to cut against.

54 The knives in the cylinder B are held by forcing them into slots made in the cylinder, but may be held by screws or other ways.

These knives are so arranged that in their revolution their edges will merely touch the roll above for the purpose of cutting anything that may be brought between them. This roll turns only when acted upon by the knives below, to which cylinder of knives the crank is applied.

The mouth of the hopper through which the feed passes is made compressible or variable, but is not new, independent of its combination. The sides of the hopper from each end, a stationary board, F, forms the top, with the board G at the bottom, which

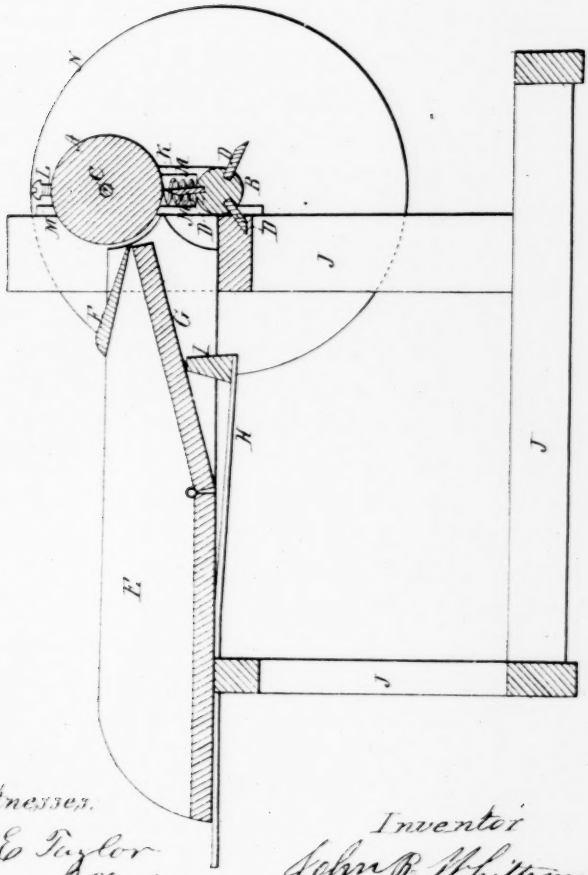
J. R. Whittemore.

Straw Cutter.

No. 394. Potts & Co. v. Crager et al. p. 52

No. 12,115. 33.119.

Patented Aug. 20, 1861.



Witnesses.

D. C. Taylor

George S. Taylor

Inventor

John R. Whittemore

board is hinged at one end as seen, and acted upon by the spring H and block I, which press against it. This spring runs back over the standard which supports the hopper and is held between the standard and hopper, and is allowed to slide forward and back according to the pressure desired upon the spring board G and the feed in the mouth of the hopper. When pressed back as represented a hard pressure is produced, but when entirely forward very little or none. In cutting some kinds of feed, as hay, when considerable length is desired, but little pressure is needed; but when it is desired to cut stalks, the number of knives usually used prevent their being cut to advantage, the knives being so near together the stalks are crowded in between them and clog them up, so that it cuts slow and hard, very few can be cut at once; but by dispensing with all but two or three knives there is no chance for clogging between them, and about three times as large a body of feed can be cut very easy. Then this compressible mouth is absolutely necessary to prevent the stalk from coming back from the place or point of cutting, so that the next revolving knife will take hold of it, and when it does take hold of it to prevent it from being drawn too easily and thus too far forward, causing it to be cut too long, it gives a regularity of cut which otherwise cannot be obtained; also making it self-feeding.

If the knives upon the cylinder B are near enough together so that the knives behind will pinch the feed to hold it before the one in front has cut it off, the feed, and more especially the stalks, will crowd and clog between them. Then to make an effectual stalk cutter from the common hide-roll cutter it is necessary to use a less number of knives than has heretofore been used, and, if so, it seems necessary to combine with — a compressible mouth to the hopper or its equivalent to hold the feed until the next revolving knife shall reach it and draw it forward and cut it off. The hide-roll cutter has heretofore been considered not valuable for stalks for the reason above named; it is not a self-feed without at least five knives upon the cylinder which are too many for stalks.

Although a less number of knives on the cylinder does not produce as many cuts at a turn of the crank, yet this deficiency is more than made up by the large body of feed it will cut at once. This compressible mouth will so regulate and hold the feed back and compress it that one knife will cut twice as fine as twelve or fourteen in the usual way for fine cuts, and three knives will cut as fast as fourteen, because of the larger body of feed it will cut at once. It is intended to use in this machine from one to three knives. The roll can also be made smaller as a less number of knives cut upon it to wear it out, thus a larger machine can be furnished for the same price as a machine of the same size at a less price.

Claim:

The compressible mouth of the hopper in combination with the hide-roll A or its equivalent and the cylinder of the knives B, substantially as and for the purpose specified.

JOHN R. WHITTEMORE.

56 RESPONDENTS' EXHIBIT BLACKIE PATENT.

58 UNITED STATES PATENT OFFICE.

GEORGE BLACKIE, of New York, N. Y.

Improvement in Machines for Pressing Tobacco.

Specification forming part of Letters Patent No. 57280, dated August 21, 1866.

To all whom it may concern:

Be it known that I, John Blackie, of New York, in the county of New York, and State of New York, have invented certain new and useful improvements in machines for manufacturing plug-tobacco; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making part of this specification, and to the letters of reference marked thereon, like letters indicating like parts wherever they occur.

To enable others skilled in the art to construct and use the invention, I will proceed to describe it.

(Here follows diagram marked p. 57.)

Figure 1 is a top-plan view; Fig. 2, a longitudinal vertical section taken on the line *x x* of Fig. 1; Fig. 3, a perspective view of a part of the apparatus detached.

My invention consists in a novel construction of a machine for pressing and forming tobacco-leaves into continuous strips or plugs, and then cutting it into plugs of the required length, all at one operation.

A represents the frame of the machine, which may be constructed of any suitable size and material. Transversely of this frame is mounted one large roller, C, having grooves in its surface circumferentially of a width corresponding to the width of the strip or plug to be formed.

D represents a pressing-roller, having flanges or projections thereon so located as to fit into the grooves in roller C. Another similar but smaller roller, *c'*, is located as shown in Fig. 2, and has its bearings in slots in the supports *h*, by which means it is left free to rise and fall as circumstances shall require.

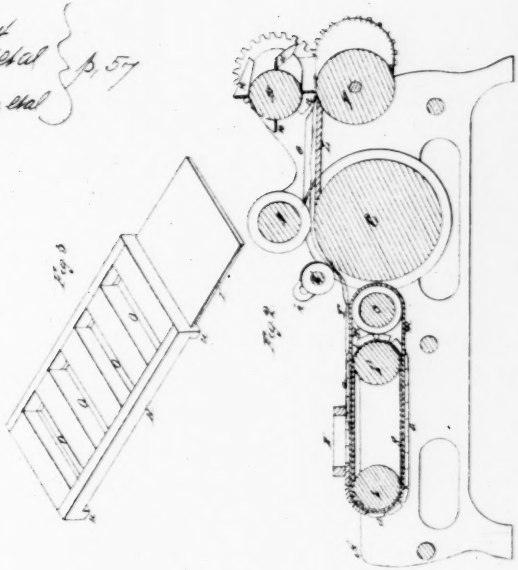
Two plain rollers or cylinders, *b* and *b'*, are located as shown clearly in Fig. 2, and around them is stretched a belt, B, or endless apron, which serves to carry the tobacco forward to the pressing-rollers C and D. This apron B has attached to its surface a series of blocks, *a*, these blocks being secured in continuous rows, and the rows being of such distance apart as to form channels between them corresponding in width to the width of the grooves in the wheels C, the channels in the belt or apron B being in direct line with the

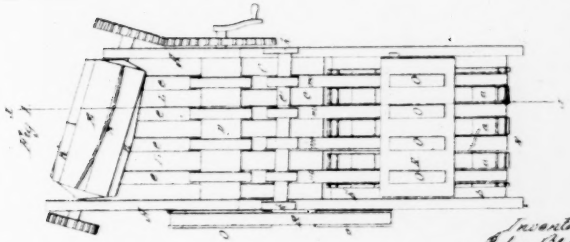
J. Blackie.

Preparing Tobacco.

No. 57,280. Patented Aug 21, 1866

No. 294 Poole et al
No. 57 Creager et al





Witnesses
P. J. Dodge
Y. R. Anderson

Inventor
John Blackie
By his atty
P. J. Dodge

grooves in the wheel C. A belt, *m*, of proper width to fit in the channels of the belt B, is then placed over and around the latter, and extended around the roller *c*, resting on the flanges of the latter. There will, of course, be as many of these belts *m* as there are channels or grooves in the apron B and wheel C. It will, of course, be understood that any number of these channels and grooves may be used by making the machine of the proper width, and that by making the channels and grooves of varying widths a series of strips or plugs of different widths may be formed at one operation.

To place the tobacco properly and regularly in the channels of the apron B, so as to form a strip or plug of uniform thickness, I use a series of frames, H, as shown in Fig. 3. This frame is made of a convenient size to handle, and is provided with a series of openings, *o*, arranged to correspond in width and location with the channels of the apron B, as shown in Fig. 1. This frame H is provided with a sliding bottom, I, as shown in Fig. 3, so that when the cells or openings *o* have been properly filled with the prepared tobacco by hand, and the frame placed on the apron B, and the bottom I drawn out by the attendant, the tobacco in the cells *o* will fall down into the channels of the apron B, and thus be fed forward to the pressing-rollers.

In order to keep the machine supplied with tobacco, the apron B will be made of considerable length and a number of the frames H will be used, some being filled while others are being emptied, care being taken to so place the frames as to form a continuous supply of tobacco upon the apron B.

To insure the ready placing of the frame H in proper position on the apron B, it is provided with the projections *n* on its lower side, which serve as guides in placing it on the apron.

From the opposite side of the roller C a platform, L, extends, having cleats or raised projections *c* thereon, as shown in Fig. 1, thus forming a series of channels or grooves corresponding with those on the apron B and with the grooves on the roller C, to guide the strips of tobacco from the roller C forward to the cutting apparatus.

At the end of the machine is located a roller, F, having its
59 upper surface flush with the upper surface of the platform L, as shown in Fig. 2. Above this roller is mounted another roller, E, having a series of spiral knives, *n*, projecting radially from its periphery.

It will be observed that these rollers E and F are mounted diagonally in the frame, as shown in Fig. 1, and as the knives are wound spirally around the roller E it follows that the knife will cut in but a portion of the channels at once, usually but one, it cutting in the others successively, thus requiring much less power to cut the strips than would be required if it were cutting them all at once.

It will also be seen that by thus arranging the knives the one in operation will begin to cut on one edge of the strip first, and continue to cut across it as the cylinder E revolves, and thus also cut square across the strip while it continues to advance.

In order to cut plugs of different lengths at the same time, a por-

tion of the knives will be made to extend only part way across the cylinder, as shown at *a'* of Fig. 1; and as there may be any number of the knives thus arranged, it is obvious that plugs may be thus cut of different lengths at the same time.

In order to vary the operation and change the length of the plugs at will, the knives should be so attached to the cylinder that they can be removed or added at pleasure.

It will, of course, be understood that the various parts of the machine will be so geared as to cause the parts to move in the required direction and with corresponding velocities.

The cylinders E and F should be geared together, as shown in Fig. 2, and motion may be imparted to them direct from the cylinder C, as shown in Fig. 1, a pulley, O, on the opposite end of C serving to convey motion through the belt R and pulley P to the apron B and the belts *m*.

The operation is as follows: The frames H, being filled with the prepared tobacco, are placed on the apron B, and the bottom I being withdrawn permits the tobacco in the several cells *a* to fall into the channels of the belt or apron B, the tobacco resting on the belts *m* in the bottom of said channels. Motion being imparted to the machine, the tobacco is carried forward to the cylinder C, and passes up between it and the roller *c*, which latter, by its weight, presses the tobacco into the grooves of cylinder C and helps to feed it forward. It then passes under the pressing-roller D, by which it is thoroughly compressed, said roller D being provided with screws and springs to regulate the pressure as desired, and as is usual in this class of machines.

The strip of tobacco represented by T in Fig. 2 is carried or pushed forward after being pressed across the platform L, and enters between the rollers E and F, where it is cut by the knives *a* into plugs of the required length, as already explained.

It will thus be seen by the use of a machine constructed on this plan a large number of strips can be pressed at once, and that strips of different widths may be formed at the same time and the same cut into plugs of various lengths, all at one operation.

Having thus described my invention, what I claim is—

1. The apron B, having a serious of channels of varying or uniform widths for receiving and conveying the tobacco to the pressing-rollers, substantially as set forth.

2. In combination with the apron B, constructed as described, the belts *m*, when said parts are arranged to operate as and for the purpose set forth.

3. The combination of the grooved cylinder C, adjustable roller *c'*, and pressing-roller D, substantially as shown and described.

4. A cutting apparatus constructed and operating substantially as set forth.

5. The frame H, provided with the cells *a* and sliding bottom I, arranged and operating substantially as and for the purpose set forth.

JOHN BLACKIE.

Witnesses:
ALEX'R HARTHILL.
W. J. D. HEWITT.

A. ALEXANDER.

Improvement in Machines for Grinding Clay, &c.

No. 125,159. Patented April 2, 1872.

No 394
Potts et al
Creager
et al
p. 61

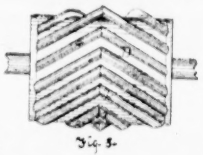


Fig. 3.

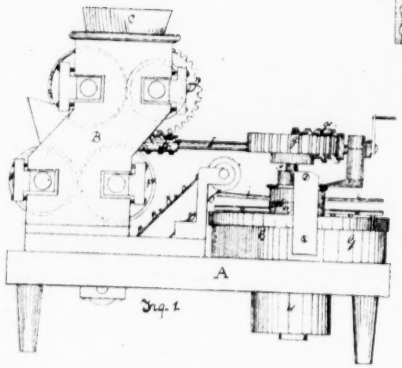


Fig. 1.

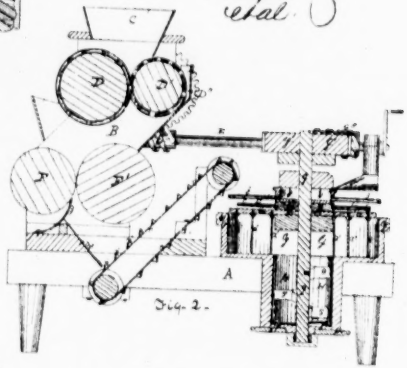


Fig. 2.

Fig. 5

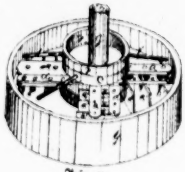


Fig. 4.

Witnesses:
R. F. Marshall
Thos. McKeen

Inventor:
Abram Alexander
by Bakewell & Church
his Attys.

60 RESPONDENTS' EXHIBIT ALEXANDER PATENT.

62 125,159.

UNITED STATES PATENT OFFICE.

ABRAM ALEXANDER, of Pittsburg, Pennsylvania, assignor to himself, Joseph A. Robinson, and James Ewing, of same place.

Improvement in Machines for Grinding Clay, &c.

Specification forming part of Letters Patent No. 125,159, dated April 2, 1872; antedated March 26, 1872.

Specification.

To all whom it may concern:

Be it known that I, Abram Alexander, of the city of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful improved machine for grinding, mixing, and tempering rock, clay, &c.; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawing making a part of this specification, in which—

(Here follows diagram marked p. 61.)

Figure 1 is a side elevation of my machine. Fig. 2 is a longitudinal vertical section thereof. Fig. 3 is a face view of one of the grinding-rolls. Fig. 4 is a perspective view of the mixing-pan and stirrers; and Fig. 5 illustrates the mode of changing the angle at which the stirrers operate.

Like letters of reference indicate like parts in each.

The nature of my invention consists in the construction of a machine for grinding, mixing, and tempering rock, clay, &c., for use in the arts, such machine consisting of double-spiral toothed crushing and grinding rollers, from which the material passes between a pair of plain cylindrical rollers, whence it is carried by an elevator to a mixing-pan, which contains revolving stirrers, devices for shifting the angle at which the stirrers operate, and devices for supplying the material with water, and beneath mixing-pan is a mill, into which the clay is discharged from the mixing-pan after it has been properly tempered and mixed.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and mode of operation.

The frame-work A, by which the devices are supported, may be of any suitable or convenient construction, as also the uprights B and hopper C. In boxes set in the uprights B I adjust the spiral-toothed grinding and crushing rollers D D', so that their spiral teeth shall mesh into each other and one roller operate the other at the

same time that the material is passing through without the use of other gear for that purpose. The form of the double-spiral teeth is shown in Fig. 3. Motion is communicated to one of these rollers by an endless screw, E', on the main driving-shaft E, which plays into a gear-wheel, D'', on the roller, D'. The rock, clay, or other material, as it passes through between the spiral teeth of the rollers D D', is subjected to both a crushing and a grinding force, and consequently can be more perfectly reduced from a lump or rock to a pulverized condition. But to secure a more perfect pulverization I arrange under the rollers D D' another pair of rollers, F F', having plain or smooth faces, one somewhat larger than the other, and communicate motion to one of them by a gear-wheel and screw-thread on the shaft E of the form above described. By gearing up only the smaller roller F and operating the larger roller F' by frictional contact alone, I secure not only an increased biting or crushing operative area between the two, but also secure a slight grinding effect, as the tendency of the larger roller F' will be to drag somewhat behind the other. A discharging guide, *m*, causes the pulverized material to fall down an apron, *m'*, whence it is caught by buckets *n'* on an elevator, *n*, carried up and discharged into the mixing-pan G. This mixing-pan G is placed horizontally, and has a vertical shaft, *g*, extending up through it along its axial line, and also along the axial line of the pug-mill H immediately below. On the upper end of the shaft *g* is a gear-wheel, *g'*, which is operated by a screw-thread, *g''*, on the main driving-shaft E. At or near the mouth of the pan G a series of arms, *a*, extend radially out, and each arm *a* carries a number of flat-bladed knives or stirrers, *a'*, which cut edgewise through the clay in the mixing-pan, though by the means presently to be described these knives or stirrers may be set at a slight angle. Just above the arms *a* a collar, *c*, is adjusted on the shaft *g*, sufficiently tight to rotate with it, but not so tight but that it may be shifted slightly. To the under side of this collar, *c*, near its periphery, by a wrist or ball-and-socket or other like joint, is attached a series of shifting-bars, *d*, each one of which is so adjusted as to be parallel with and a little behind one of the arms *a*. From the shank of each of the blades or stirrers *a'* (the journal of each blade working freely in its arm *a*) a shifting-lever, *e*, extends to its shifting-bar *d*, and is loosely pivoted thereto, while it is rigidly fastened to the shank of the stirrer *a'*. The collar *c* has a lever, *c'*, attached to it, by which it is rotated a short distance either way. By shifting the collar *c* the shifting-bars *d* receive a slight motion in the direction of the length and tangentially to the collar *c*. This motion causes the rear ends of the levers *e* to be moved toward or from the vertical shaft *g*, and by this motion the stirrers *a'* receive a slight rotary motion on their axes or bearings which pass through the arms *a*. In this way these stirrers *a'* are caused to pass through the clay in the mixing-pan either edgewise or at a slight angle, as may be preferred. Above the collar *c* I place a water-tank, *f*, fix it tight to the shaft *g*, and extend out from it a perforated pipe, *i*, over each stirring-arm *a*, the perforations being so arranged that jets of water will be discharged into the

tracks of the stirrers *a'*. Such devices for supplying water may be arranged in such number as may be desired over each arm *a* or over every alternate arm. In this way the clay is tempered to the proper consistency and finally worked toward the center of the mixing-pan, whence it passes down into the pug-mill H, where it is further operated on by the inclined blades S in the usual manner, and discharged through apertures *k* at the bottom, which may be opened or closed at pleasure by gates *x'*. It is then ready for the molds. The pug-mill H I make slightly flaring—that is, enlarged somewhat toward its lower end. This outward spread or enlargement is but slight, however, and facilitates the discharge of the tempered clay.

The angle which the double-spiral teeth *z* on the rollers D D' make with each other may be varied at pleasure, as also the relative size of the smooth rollers F F', so long as they be not of the same size. By the use of an elevator, *u*, for carrying the pulverized clay from the crushing-rolls upward and discharging it into the mixing-pan, I am enabled to arrange all my machinery on the same floor or foundation, and so save expense in building.

I am aware that plain-faced crushing-rolls are not by themselves new, and that pinion-wheels having double-spiral gear-teeth have been used in driving machinery, and also that a mixing-pan has been supplied with water through the driving-shaft, which was made hollow for that purpose. These features of themselves I do not claim as new.

What I claim as my invention, and desire to secure by letters patent, is—

1. The collar *c*, arranged on the vertical shaft *g*, with its shifting bars *d*, the latter being connected by shifting-levers *e* with the shanks of the stirrers *a'*, for adjusting them to any desired angle, substantially as described.

2. The construction and arrangement of an elevator, *u*, between the crushing-rolls F F' and mixing-pan G, and on the same level or floor with both, substantially as described.

3. The water-supply tank *t*, arranged on and outside of the shaft *g*, above the mixing-pan G, in combination therewith, and with pipes *i* and stirrers *a'*, substantially as described.

4. The main driving-shaft E, having a double arrangement of screw-threads, arranged with reference to wheel *g'* on shaft *g* and the gearing of the rollers D D' F F', so as to communicate power to all, substantially as described.

In testimony whereof I, the said Abram Alexander, have hereunto set my hand.

ABRAM ALEXANDER.

Witnesses:
THOS. B. KERR,
B. C. CHRISTY.

64 RESPONDENTS' EXHIBIT FLETCHER PATENT.

66 116,039.

UNITED STATES PATENT OFFICE.

MOORE R. FLETCHER, of Boston, Massachusetts.

Improvement in Pulp-engines or Crushers.

Specification forming part of Letters Patent No. 116,039, dated June 20, 1871.

To all whom it may concern:

Be it known that I, Moore R. Fletcher, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain improvements in pulp-engines or crushers, of which the following is a specification:

(Here follows diagram marked p. 65.)

Figure 1 is a side elevation of my invention; Fig. 2, a section through line *x x*, Fig. 1; and Fig. 3, a similar section, showing a modification.

This invention relates to the crushing of pulp for paper manufacture; and it consists of a peculiar form and arrangement of crushing-cylinders, as will hereinafter more fully appear.

In the drawing, A B represent the crushing-cylinders, which are located one above the other, and composed of sections B', shown in Fig. 1. The cylinder A is provided with projections or cogs C, which engage with cogs D on the lower cylinder B and revolve the same, power being applied to the shaft of cylinder A. E E, &c., represent buckets located between cogs C of cylinder A, while the corresponding spaces *b* between cogs B are flattened, as shown in Fig. 2. The sections B' are so located as to cause the cogs C and buckets E to alternate longitudinally, thereby breaking joints, as it were, and avoiding continuous lines of buckets and cogs along the periphery of cylinder A, while the cylinder B, being correspondingly arranged, meshes perfectly therewith.

Fig. 3 shows an equivalent construction, in which H represents a cylinder, provided with depressions I on its periphery and revolving over a plain cylinder, J, the cylinder H being constructed in sections arranged like those of cylinder J.

Operation.

The cylinder A is revolved in the direction of the arrows in Fig. 2, the cogs C thereof engaging with the cogs D of cylinder B and revolving the same. The pulp in passing through the tub flows over the "riser" K, and, entering the buckets E on the lower side

M. R. FLETCHER.

Pulp Engines or Crushers.

No. 116,039. Patented June 20, 1871.

Fig. 2.

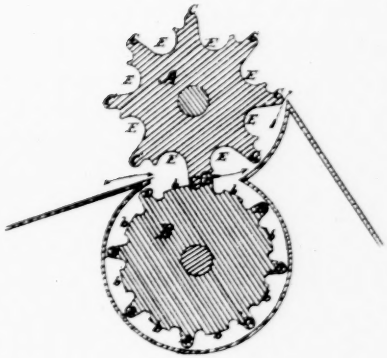


Fig. 1.

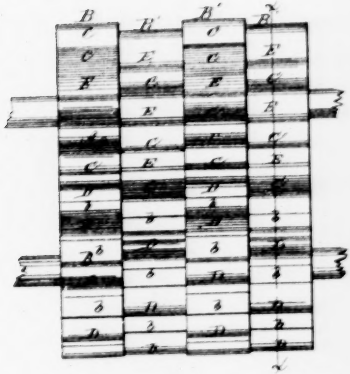
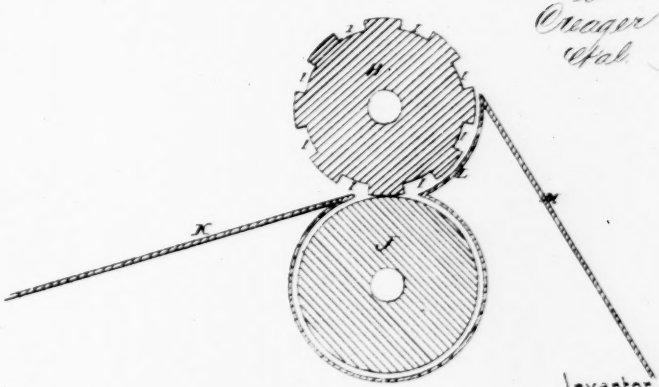


Fig. 3.



No. 394. Cattle & Co Creaser Cal. p. 65

Witnesses.

Aug. P. Baker

Inventor.

Moore R. Fletcher.

By Cowles & Wright & Brown

Attys.

of the cylinder A, is carried by the same up the inclined apron L, and is thrown out over the "back-fall" M, and is crushed in its passage by the alternating buckets and cogs much more thoroughly than if the same were continuous, while the deep buckets E, in connection with the flat surfaces *b* of cylinder B, constitute conduits of sufficient capacity to create a current in the pulp of the desired rapidity.

This device not only crushes the pulp more rapidly than by the ordinary arrangement of bars and bed-plates, but it also preserves a longer and stronger fiber, thereby producing better and stronger stock.

Having thus fully described my invention, what I claim as new, and desire to secure by letters patent, is—

1. The cylinder A, provided with cogs C and buckets E, the same alternating longitudinally, substantially as described.

2. The cylinder B, provided with cogs D and flattened spaces *b*, the same alternating longitudinally, substantially as described.

3. The combination and arrangement of cylinders A B, substantially as described.

4. As an equivalent of cylinders A B, the indented cylinder H and plain cylinder I, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

MOORE R. FLETCHER.

Witnesses:

CARROLL D. WRIGHT.

CHARLES F. BROWN.

67 RESPONDENTS' EXHIBIT WELLS' PATENT.

69 UNITED STATES PATENT OFFICE.

T. J. WELLS, of New York, N. Y.

Improved Peat-machine.

Specification forming part of Letters Patent No. 52472, dated February 6, 1866.

To all whom it may concern:

Be it known that I, THOMAS J. WELLS, of the city, county, and State of New York, have invented a new and useful improvement in machines for treating peat; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

(Here follows diagram marked p. 68.)

Figure 1 is a side view of a machine made according to my invention. Fig. 2 is a longitudinal vertical section on the line *x* of Fig. 3. Fig. 3 is a plan.

Similar letters of reference indicate like parts.

The object of this invention is the preparation of peat for fuel in a condensed state, with or without coal-dust or other fine concentrated combustible matter, so that it can be handled with convenience and transported with ease and economy to be used at a distance from the place where it is dug.

It consists in a combination and arrangement of devices by means of which the peat is reduced to a suitable condition and form for being handled and dried, the crude peat being elevated by mechanical means to the top of the machine and delivered to the action of knives or arms which revolve between fixed knives or arms so as to break it up. This action on the peat is had beneath a hopper, from which is delivered, continuously, a supply of fine coal-dust or other fine concentrated combustible material. It is next passed between smooth cylinders of unequal diameters, or between cylinders which are revolved at unequal velocities, whose action is to destroy the natural organization of the peat and to destroy the tubular character of the undecomposed fibers which are interlaced through it, rubbing and grinding the mass so as to reduce it to a very fine plastic state. From thence the peat descends or is carried against molders, which consist of rolls upon whose peripheries are formed triangular depressions, which are arranged on one roll conversely to their arrangement on the other, so that when the depressions meet or articulate in the revolution of the rolls a cavity is formed whose sides are parallel. The peat mass presses, by gravity, against

T. J. WELLS.

Peat Machine.

No. 52,472. Patented Feb. 6, 1866.

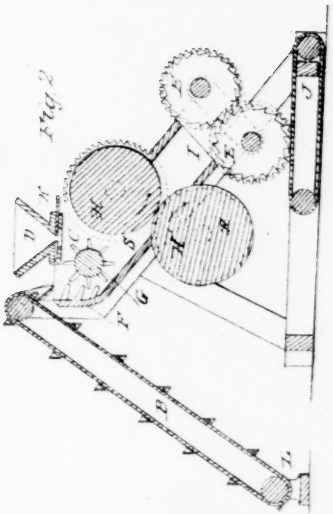


Fig 2

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Potts vs.
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p. 68

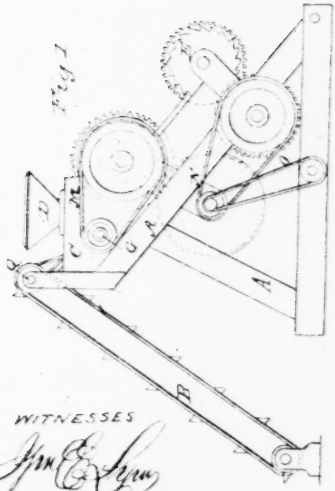


Fig 1

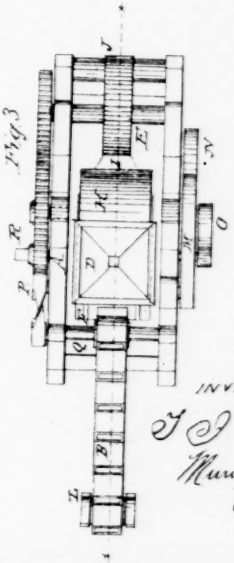


Fig 3

WITNESSES

Jno. E. Lynn

F. W. Harrington

INVENTOR

T. J. Wells

Munn & Co
Attorneys

the faces of the rolls and fills the depressions as fast as they are presented, and is afterward delivered upon the other side of the rolls on a traveling belt or platform, which carries it to the drying-ground, or to workmen, who remove it to the place where it is to be dried.

A is a frame which supports the moving parts of the machine. Its form is such as to facilitate the easy and convenient descent, by gravity, of the peat from the higher to the lower parts of the machine, the crude peat being delivered to it at its top. In the higher part of the frame is a box, C, with straight sides, which is the receptacle that first receives the crude peat. The bottom of this receptacle is inclined forward, and its rear side and bottom are armed with projections or teeth F, in a rising series, between which pass revolving teeth which project from a shaft, G, arranged within the box C.

The journals of the shaft G have bearings in the sides of the box, and the ends of the shaft outside of the box have pulleys, one of which receives a band, M, that goes around a pulley on the shaft of the upper rubbing-cylinder, H, and the other a band, P, that drives the shaft Q, from which the elevator B is suspended.

The elevator B is composed of an endless band provided with buckets, and its lower end goes around a shaft placed in a shoe, L, which may be fastened or secured to the ground, or to any platform, or directly on the bottom of the peat-bed.

The crude peat is shoveled or placed in the buckets of the elevator, and is carried up in them to the top of the machine, where, by the turning of the buckets, it is dumped into the box C directly upon the fixed arms F and the arms of the revolving shaft G, by and between which it is torn apart.

It is sometimes desired to mix fine coal-dust or other fine combustible material of a concentrated character with the peat. To this end I have placed a hopper, D, over the shaft G, such hopper having a gate, K, at its bottom that keeps it closed when pushed in.

When it is desired to add coal-dust or other material to the peat the hopper is kept supplied therewith, and it is drawn thence and allowed to fall on the peat while it is being cut up by the knives or pins of the shaft and of the box in regulated quantities by opening the gate to a greater or less extent. The coal-dust or other substance becomes, by this means, thoroughly mixed with the peat.

The peat becomes broken up into a common mass by the operation of the knives or pins on the shaft G and those of the box, its lumpy character being destroyed, so that it will easily glide down the bottom of the box toward the cylinders H H'. These cylinders may be of metal or of any suitable material. They revolve between the vertical sides of the box C, the upper cylinder rising above the upper edges of the box, and the lower cylinder working through its bottom, which is cut away to receive it and allow it to revolve without producing friction. That part of the bottom of the box which is above cylinder H' is cut away a little, so as to allow any water which is separated from the peat to run away. The cylinders H H' are geared together in this instance by gears of equal diameter, but

the cylinders themselves are of unequal diameters, the lower cylinder, H', being the largest, from which it follows that since both cylinders make their revolution in the same period of time, the surface of the lower cylinder, H', will rub against and slip on that of the upper. They are placed close to each other, so that they will revolve in contact, and are, in this example, placed in such relative positions that a line which is tangential to each at their point of contact will be about parallel with the bottom of the box C. Their point of contact is above the bottom of the box far enough to enable the peat to readily enter the angle between their peripheries. The power to drive the cylinders, and through them the other moving parts of the machine, is applied to the shaft R of cylinder H' on the end opposite to that seen in Fig. 1. On the shaft of cylinders H H' are mounted gear-wheels of equal diameters, which engage with each other, so that their shafts are driven at the like speed. When the peat falls against the cylinders, after it has passed the toothed shaft G, it is drawn between them, as between feed-rolls, the lower cylinder rubbing the peat against the upper cylinder with a tearing and grinding action, for the reason that its surface moves with greater speed than that of the other, and at the same time crushing the peat, so that when it emerges from between them its fibers—that is to say, the undecomposed matter which is interlaced throughout the peat—is crushed and also torn to pieces. The cylinders are set so close together that the peat, in passing between them, will be made very fine, so that its air and water cells will be destroyed and the air and water contained in the peat will be released, the water being forced or held back as the peat is drawn forward between the cylinders, trickling down between the bottom of the box and the lower cylinder at S, and so reaching the ground. The peat passes the cylinders in a very thin state, and is delivered, much condensed, into the lower part, I, of the box. This part I is a covered receptacle whose lower end is narrowed to the width of the molding-cylinders E.

These molding-cylinders have angular depressions in their peripheries, whose articulations form molds of the shape of a parallelogram.

The lower part of the receptacle I has its sides gradually narrowed to the width of the cylinders E, as shown in the plan, Fig. 3.

The gravity of the mass of peat, or of the peat and coal when the two are mixed, and also the pressure produced by the accumulations thereof, that are continually brought forward by the cylinders H H', cause it to be forced against the faces of cylinders E with sufficient energy to fill their depressions as they present themselves, and the portions which fill them are carried through or between the cylinders and delivered upon the belt J in blocks of a shape conforming to the depressions in said molding-cylinders.

The belt J is driven by a band, O, from the shaft of the lower cylinder, H', and it may be made of any suitable length, so as to carry the blocks to the drying-ground, or to a house or other place for drying them by artificial means.

The molding-cylinders E have gears on the ends of their shafts at one side which mesh together, and they are driven by a belt, N,

from a pulley on the shaft of cylinder H', said belt going around a pulley on the shaft of one of the cylinders E.

The blocks of peat are stacked and dried by the circulation of air through them and by the heat of the sun, or by artificial means, and are then ready for transportation and use.

The peat is greatly condensed and diminished in bulk by the treatment above described. Even before it is dried it is found to have considerable density in comparison with its condition when crude.

Instead of using rubbing-cylinders of unequal diameters, cylinders of the same diameter may be employed by running them at different speeds.

It will be observed that the cylinder G is driven by a belt, M, from a pulley on the shaft of the upper mashing-cylinder, H, and that the elevator is driven by means of a belt, P, from the farther end of the shaft of cylinder G. The delivery belt or apron J is driven in this example by a band, O, from a small pulley on the shaft R of cylinder H'.

The usual moving or rotating parts of the machine may be driven in any other manner, and the form of the several parts of the apparatus may be varied without departing from the principle of my invention.

The action of the cylinders H H' on the peat is not like the action of ordinary pressure-rollers, but they, while feeding the peat forward in the machine, tear it apart, owing to the difference in the speed at which their peripheries move, at the same time reducing it very fine and excluding the water released from its cells,
71 so that the peat is delivered to the molders in a condensed state. The peat, after having been passed through the cylinders H H', will have parted with so much of its water that the succeeding operation of drying is much hastened.

I claim as new and desire to secure by letters patent—

1. Mashing and grinding peat and breaking up its air and water cells between smooth cylinders whose peripheries move at different velocities, substantially as described.

2. The cylinders H H', whose peripheries are made to move at different velocities, in combination with a series of fixed or revolving knives, or both, for breaking up crude peat before it is delivered to the action of said cylinders, substantially as described and shown.

3. The cylinders H H', whose peripheries move at different velocities, in combination with a series of fixed or revolving knives, or both, and with an elevating apparatus for delivering crude peat to the action of the knives and of the cylinders, substantially as shown.

4. Cylinders H H', constructed and operating substantially as described, in combination with the molding-cylinders E E, substantially as above described.

5. In combination, the cylinder G, armed with knives or arms, as described, the hopper D above it, and the cylinders H H', substantially as described.

6. Mixing coal-dust or other fine concentrated combustible material with crude peat while its lumps are being broken up, by means of a hopper, D, for containing such coal-dust or other material, and of a system of revolving knives or arms below the hopper, substantially as described.

THOS. J. WELLS.

Witnesses:

M. M. LIVINGSTON,
C. L. TOPLIFF.

(No Model.) 2 Sheets—Sheet 1.

J. M. CASE.

FEED BOX FOR ROLLER MILLS.

No. 297,764. Patented Apr. 29, 1884.

No. 394 Pottle et al v. Crager et al p 7 3

FIG. 1

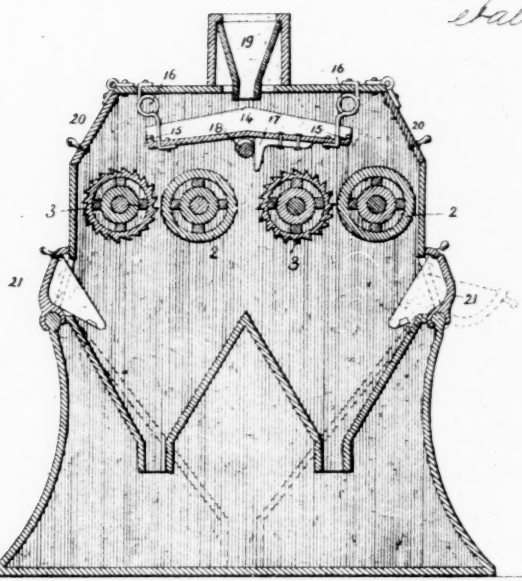
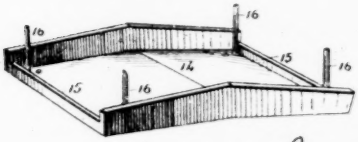


FIG. 2



ATTEST

J. Henry Kaiser

Geo. T. Smallwood

INVENTOR.

John M. Case

By Knight Bros

Attys

(No Model.) 2 Sheets—Sheet 2.

J. M. CASE.

FEED BOX FOR ROLLER MILLS.

No. 297,764. Patented Apr. 29, 1884.

no. 394.
Potter & Co.
v.
Creager
et al
} p. 74

FIG. 3.

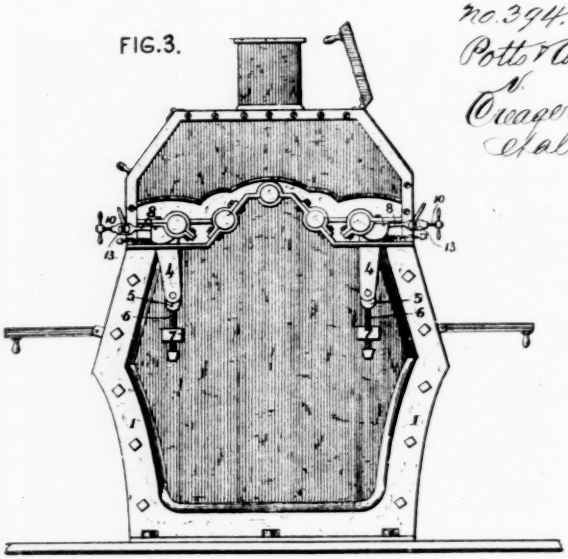


FIG. 5

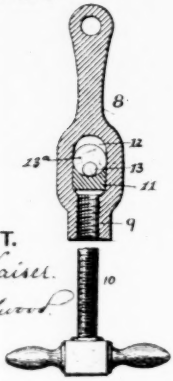
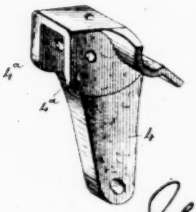


FIG. 4.



ATTEST.

J. Henry Kaiser.
Geo. T. Smallwood.

INVENTOR.

John M. Case
By Knight Bros
Attys

72 RESPONDENTS' EXHIBIT CASE PATENT.

75 UNITED STATES PATENT OFFICE.

JOHN M. CASE, of Columbus, Ohio, assignor to the Case Manufacturing Company, of same place.

Feed-box for Roller-mills.

Specification forming part of Letters Patent No. 297,764, dated April 29, 1884. Application filed December 10, 1883. (No model.)

To all whom it may concern:

Be it known that I, JOHN M. CASE, a citizen of the United States, residing at Columbus, in the county of Franklin and State of Ohio, have invented certain new and useful improvements in feed-boxes for roller-mills, of which the following is a specification.

My invention relates to that class of mills in which one or more pairs of rolls are used for crushing the grain; and it consists of a feed-box suspended above the rolls by spring-hangers which are adapted by their own resilience to resist the action of an eccentric or cam and impart a counter movement to said box, as hereinafter described and claimed.

In order that my invention may be fully understood, I will proceed to describe it with reference to the accompanying drawings, in which—

(Here follow diagrams marked pp. 73 & 74.)

Figure 1 is a vertical section of a roller-mill with my improved box applied, the section being taken at right angles to the rolls. Fig. 2 is a perspective view of my improved feed-box removed. Fig. 3 is a side elevation of the complete machine, showing the means for adjusting the rolls. Fig. 4 is a perspective view of the lower section of the journal-box of the movable roll. Fig. 5 is a longitudinal section of the link for regulating the distance asunder of the rolls.

1 represents the side of the casing, which is cast at top with a flange in which are formed the lower parts of the bearings or boxes for the fixed rolls of the mill, and for the shaft employed for vibrating the feed-box.

2 3 and 2 3 are two pairs of rolls, the inner ones being the stationary rolls, having bearings in boxes partly cast in the case 1, the outer rolls being the adjustable or movable ones and having bearings in boxes formed on the upper ends of rocking supports 4. The arm of each support extends through an opening in the flange of the plate 1, and is fitted at its lower end in a concave seat in a block, 5, which is supported by a screw, 6, having bearings in a lug, 7, formed on the case. By this means the rolls may be leveled

by simply adjusting the screw 6 up or down, as may be necessary. The lower part of each box 4 is formed with two flanges or cheeks, 4^a, between which the end of a link, 8, is secured by a pin. The other end of each of the links 8 is formed with a screw-threaded socket, 9, in which works a screw, 10, the end of which bears, through the medium of a follower-block, 11, in an opening, 12, in the link 8 against an eccentric lug, 13, on the end of a transverse shaft, 13^a, in the manner already described in my application No. 96699, filed on the 31st of May, 1883. The pairs of rolls each comprise one smooth roll, 2, and one toothed, milled, or corrugated roll, 3, either of which may be used as the stationary or movable roll, as found desirable.

14 represents the feed-box, which is constructed of a floor sloping toward each side, and preferably provided with shallow bridges 15, over which the material is shaken. The box is suspended from the top of the machine by elastic straps or spring-hangers 16, which are preferably formed of steel springs, one end of each of which is fastened to a corner of the box, and the other coiled and attached to suitable fixed parts of the frame, the springs on the opposite sides of the box being coiled in opposite directions, so as to keep it normally in a central position. I prefer to employ coiled springs, as they possess many important advantages over straight ones, among which may be mentioned that, by reason of the greater length of the piece of metal employed, a coil-spring will allow a more uniform freedom of movement to the box and be less liable to snap than a straight one, all other things equal.

Attached to the bottom of the box is a lug, 17, against which works a revolving eccentric-shaft, 18, having its bearings cast in the apexes of the side plates, 1, as already described, and driven by a suitable pulley on the outside of the machine. This shaft runs through the machine parallel with the rolls, and serves to impart motion to the box 14, which is resisted by the spring-hangers 16. The material is fed to the box 14 from a hopper, 19, of any suitable construction, placed above it on the top of the machine.

76 It will be seen that by the use of a feeding apparatus constructed as above described an equal and uniform quantity of material will be fed to each pair of rolls.

The case of the machine is provided with doors 20 and 21, for inspecting the feed and the product as they fall from the rolls, respectively.

I do not claim in this application the "lug 17," nor "bridges 15," nor "the combination of a duplex feed-box with two pairs of rolls," nor "means for imparting motion to the eccentric 18," for the reason that they are all claimed in my application No. 96699, filed on the 31st of May, 1883.

The rocking support 4, which has the lower section of the journal-box for the movable roll formed thereon, is not claimed in this application; but the right is hereby reserved to claim it in a subsequent application.

I am aware that it is not new to employ flat springs to support

sieves, &c., by endwise compression, and do not claim such as my invention.

Having thus described my invention, what I claim as new therein, and desire to secure by letters patent, is—

1. The combination, in a roller-mill, of a feed-box, means for imparting motion thereto in one direction, and spring-hangers for suspending it and producing a counter movement, substantially as set forth.

2. In a roller-mill, the combination of a feed-box, coil-spring hangers for suspending said box, and means for imparting motion thereto, as set forth.

3. In a roller-mill, the combination, with a feed-box, of suitable springs coiled in opposite directions for suspending said box, and means for imparting motion thereto, as set forth.

4. In a roller-mill, the combination of a feed-box, a cam-shaft for imparting motion thereto in one direction, and spring-hangers for suspending said box and imparting a counter movement thereto, substantially as set forth.

JOHN M. CASE.

Witnesses:
OCTAVIUS KNIGHT.
L. M. HOPKINS.

77 RESPONDENTS' EXHIBIT ALSIP & DRAKE PATENT.

80 UNITED STATES PATENT OFFICE.

FRANK ALSIP and CHESTER T. DRAKE, of Chicago, Illinois.

Clay-Crushing Machine.

Specification forming part of Letters Patent No. 320,905, dated June 30, 1885. Application filed June 17, 1884. (No model).

To all whom it may concern:

Be it known that we, Frank Alsip and Chester T. Drake, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful improvements in clay-crushing machines, of which the following is a description, reference being had to the accompanying drawings, in which—

(Here follow diagrams marked pp. 78 & 79.)

Figure 1 is a side view of said machine. Fig. 2 is an end view. Fig. 3 is a plan view. Fig. 4 is a central longitudinal vertical sectional view in detail of one of the lower bearings or steps which support the inclined shaft; and Fig. 5 is a transverse vertical sectional view in detail of one of said bearings, showing a connecting-rod for adjusting the same with reference to the crushing-rollers.

Like letters of reference indicate like parts in the different figures.

The object of our invention is to provide a clay-grinding machine which may be simple in its construction and operation and which may readily and automatically separate the stones, gravel, and other foreign substances from the clay as the latter is being ground, and instead of allowing them to remain between the rollers indefinitely, and thus obstruct and prevent the entry of the clay, will remove said obstructions as rapidly as presented.

A further object is to provide a muffling mechanism in connection with said machine for the purpose of breaking the larger lumps and clods as they are fed therein, and which may automatically move up and down to permit the passage of stones and the like, and the pressure of which may be varied at will to suit the varying conditions of the clay, all of which will be hereinafter more fully described, and definitely pointed out in the claims.

In the drawings, A represents the frame-work of the machine, the top of which is placed at an angle to the plane of the horizon, as illustrated in Fig. 1, the latter being indicated by the dotted lines there shown. Secured to the cross-timbers A A' A are boxes or bearings *a a a a' a'*, which are laterally adjustable by means of the bolts a^2 and the slots in the base of said bearings, as clearly shown in Fig. 3. Adjusted in said bearings are shafts B B', upon which, respectively, are rigidly secured the bevel-pinions *b b* and the cone-

(No Model.) 2 Sheets—Sheet 1.

F. ALSIP & C. T. DRAKE.

CLAY CRUSHING MACHINE.

No. 320,905. Patented June 30, 1885.

Fig. 1.

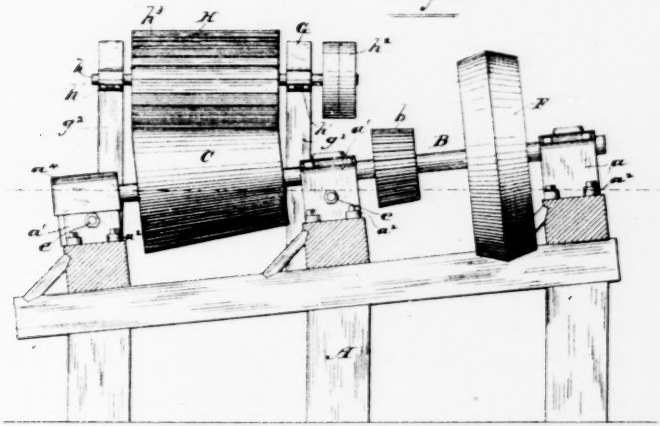
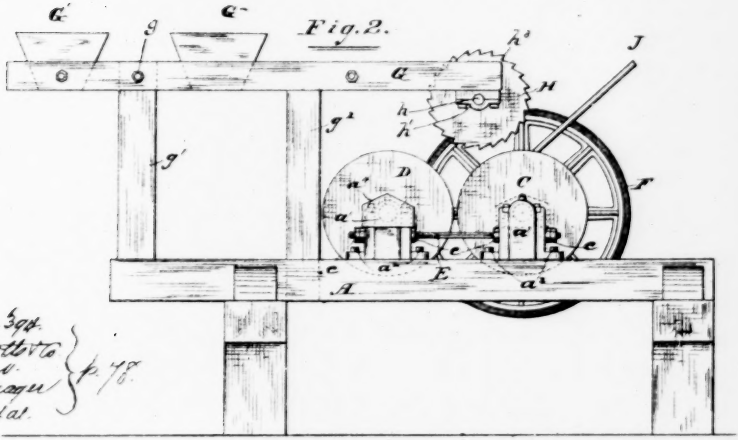


Fig. 2.



No 394.
Potter to
Craigue
Pat.
p. 78

Witnesses:
W. L. Baker
David Stevens

Inventor
Grant Alsip
Chester T. Drake.
per Gridley & Fletcher,
Attorneys.

(No Model.) 2 Sheets—Sheet 2.

F. ALSIP & C. T. DRAKE.

CLAY CRUSHING MACHINE.

No. 320,905. Patented June 30, 1885.

Fig. 4.

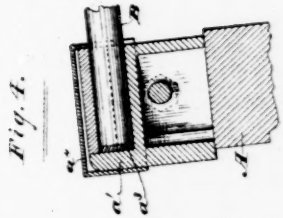
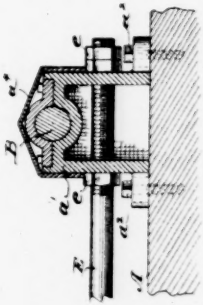
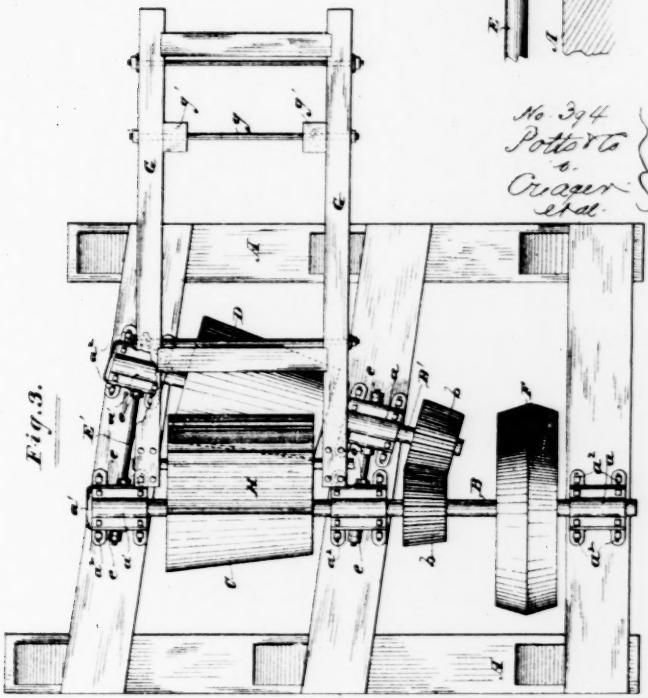


Fig. 5.



No 394 Potter & Crager et al. p. 79.

Fig. 3.



Witnesses:
W. F. Baker.
David Stevens

Inventors:
Frank Alsip
Charles T. Drake
per Gridley & Fletcher,
Attorneys.

shaped rollers C D, said rollers being preferably made of chilled iron. The angle at which the shafts B B' are placed with respect to each other should correspond to the bevel of the rollers C D, so that the respective faces may be parallel, as indicated in dotted lines in Fig. 3, while the upper surface of said rollers is preferably in a horizontal plane or thereabout.

The bearings a a and a' a', respectively, are connected by means of rods E E', Figs. 2, 3, and 5, said rods being provided with screw-threads upon the respective ends and nuts e, whereby upon loosening the bolts a^2 the position of the rollers C D with relation to each other may be adjusted to any degree of fineness desired by means of the nuts e.

I prefer to operate the shaft B by means of a cone-pulley, F, and belt; and, as said shaft is placed in an oblique position, it is important that said pulley should be coned to a considerable degree, as shown, in order to prevent said belt from running off.

As the rollers C D are of great weight, the tilting of said shafts B B' renders it necessary to provide end bearings therefor. This I accomplish by closing the lower ends of the bearings a' a', as shown in Fig. 4, and placing therein steel plates or steps a^3, against which the ends of said shafts, respectively, bear. Above the roller C, and secured to a movable frame G, I place a "muller," H, which is rigidly secured upon a shaft, h, adapted to revolve in bearings h' h', a pulley h^2 h^2, being placed upon said shaft to propel the same. The horizontal frame G, to which the muller H is secured, is pivoted by means of a bolt or rod, g, to two stationary upright posts, g' g', which are rigidly secured in any suitable manner to the frame A. Other posts g^2 g^2, likewise rigidly secured to said frame A, serve as rests or supports for the frame G and to limit its downward movement and prevent contact with the roller C. Said muller H is grooved in the manner shown, to form teeth or sharp-pointed corrugations h^3, which serve, by the weight of said muller, to cut or crush the lumps of clay as the same are fed into the hopper J preparatory to passing between the rollers C D. The belt upon the pulley h^2 is so adjusted as to permit an upward movement
81 of said muller in case the same is brought in contact with stones or other hard substances in the clay.

It is necessary to adjust the weight or pressure of said muller to the varying consistency or stiffness of the clay, to accomplish which cheaply and effectually we preferably provide stationary boxes G' G² upon the frame G upon opposite sides of the posts g', to which said frame is pivoted. If the clay is very stiff, the box G² may be weighted with stones or otherwise, and if more plastic the weight may be partially or wholly transferred to the box G'. Thus it is obvious that the pressure of the muller may be varied at will and to any extent required. We do not confine ourselves to the specific means shown for varying the pressure of said muller, as it is evident that a single sliding weight upon said frame may accomplish the same purpose.

As the clay and grit from the rollers are constantly falling upon the bearings a' a', we protect said bearings by means of close-fitting

boxes or caps a^4 a^4, preferably made from cast-iron, in the manner shown in Figs. 1, 2, 4, and 5, which are made removable in order to oil said bearings.

It is now a common practice in the art to employ two co-operating conical rolls the axes of which are horizontal and the upper surfaces of which are consequently inclined to grind clay and remove stones therefrom.

It is a well-known fact that in the use of conical rolls the axes of which are placed horizontally the tendency is to retain gravel, stones, and other hard substances in the space between them, thus not only clogging the opening and preventing the clay from passing through, but causing grooves to wear therein, thereby rendering them worthless.

Our invention is intended to overcome these difficulties; and we have discovered that by placing the axes of said rollers in such a plane at an angle to the plane of the horizon as to cause the upper surface of said rollers to be horizontal, or nearly so, this tendency to retain obstructions between the rollers is overcome, and the stones are thrown off at once from the larger ends of the rolls, thus permitting the clay to pass through freely and much more rapidly; and, while we do not confine ourselves to the use of said rolls in the exact position here shown and described, we prefer not to vary materially therefrom, as we believe that such adjustment, or one approximating thereto, is adapted to produce the most satisfactory results.

As a further and important advantage of said improvement, the waste clay thrown off may be again thrown into the hopper and passed through the rolls, thus saving a considerable amount of material which would otherwise be wasted.

We do not claim, broadly, the conical rolls described.

What we do claim, and desire to secure by letters patent, is—

1. A mechanism for crushing clay and removing stones therefrom, consisting of two co-operating conical rolls arranged with their axes at an angle to the plane of the horizon, and their upper surfaces substantially horizontal, as contradistinguished from conical rolls the axes of which are horizontal.

2. In combination with the supporting-frame and driving-gear, the two co-operating conical rolls having their rolls in a common plane oblique to the horizon, and their top surfaces in a common horizontal plane, as contradistinguished from rolls the top surfaces of which are inclined longitudinally.

3. In a clay-crushing machine, the combination of the adjusting-rods E E′ with conical clay-crushing rollers having their axes arranged in a plane oblique to the plane of the horizon, and means for propelling the same, substantially as described.

4. In a clay-crushing machine, the combination of the conical rollers C D, shafts B B′, arranged as described, with suitable bearings, adjusting-rods E E′, set-screws e, and caps a^4 a^4, substantially as described.

5. In a clay-crushing machine, the combination of the conical rollers C D upon the tilted shafts B B′ with a grooved muller con-

structed and arranged as described, and means for propelling said shafts and muller, respectively, substantially as and for the purposes set forth.

6. In a clay-crushing machine, the combination, with suitable rolls, of a muller arranged upon one end of a pivoted frame, provided with movable weights, whereby the downward pressure of said muller may be increased or diminished at will, substantially as described.

FRANK ALSIP.
CHESTER T. DRAKE.

Witnesses:
D. H. FLETCHER,
W. S. BAKER.

82 RESPONDENTS' EXHIBIT J. CREAGER PATENT.

83 UNITED STATES PATENT OFFICE.

JONATHAN CREAGER, of Cincinnati, Ohio.

Improvement in Wood-polishing Machines.

Specification forming part of Letters Patent No. 207,717, dated September 3, 1878; application filed July 26, 1878.

To all whom it may concern:

Be it known that I, Jonathan Creager, of Cincinnati, Hamilton county, Ohio, have invented a new and useful improvement in wood-polishing machines, of which the following is a specification:

My invention relates to a mechanical device for producing a smooth and dense surface upon wooden boards.

My machine comprises among its essential features a suit of feed and delivery rollers, which may be all of hard wood except the upper delivery roller, which is preferably of rubber; a cylinder of hard wood, glass, bone, ivory, or metal, highly polished on its periphery, and driven at a high speed in a direction contrary to the feed, so as to rub and slick the face of the board; a support and pressure-roller, journaled underneath the slicking-roller, located somewhat on the feed or receiving side of said slicker, and having its journal confined in a slanting housing or guide, and supported on a spring or cushion which is itself adjustable within the guide. The diameter of said supporting-roller and its location relatively to said slicking-roller are such as to bend the stuff convexly upward as it approaches the said slicker.

This temporary camber of the stuff enables the slicker to operate with its best effect in leveling and polishing the board, and so compensates for the contracting action of the slicker as to cause the polished stuff to escape from the apparatus in a straight condition. Moreover, a support and pressure-roller thus guided and capable of yielding in a slanting direction operates to, on the entrance of thicker stuff, automatically recede in a direction contrary to the feed, so as to remove the crown of the camber to a greater distance to one side of the slicker.

(Her follow diagrams marked pp. 83 & 84.)

In the accompanying drawing, figure 1 is a longitudinal section of a machine embodying my invention, a board being shown in position. Fig. 2 is a plan of the machine.

A is the frame of the machine, supporting at its mid-length a roller, B, which can be made either of metal, glass, bone, ivory, or hard wood, and if of the former material it may be provided with corrugations, which will facilitate the action of the roller in polishing; but in a machine comprising only one slicker, or the finishing-slicker in a machine possessing more than one, I prefer that the periphery of the slicker be that of a perfectly smooth and polished cylinder.

2 Sheets—Sheet 1

J. CREAGER.

Wood-Polishing Machine.

No. 207,717. Patented Sept. 3, 1878.

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Creager
et al.
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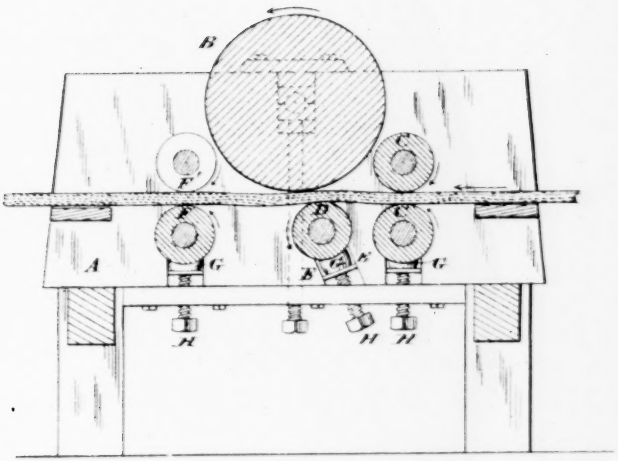

Attest.
Geo. E. Knight
Walter Allison

Jonathan Creager
By Knight Bros.
Attorneys.

2 Sheets—Sheet 2

J. CREAGER.

Wood-Polishing Machine.

No. 207,717. Patented Sept. 3, 1878.

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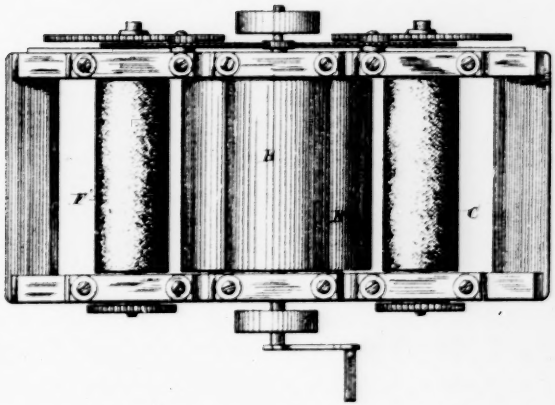
Potts & Co. } to 84
v.
Creager et al.

Fig. 2



Attest

J. Henry Kaiser
Walter Allen

Inventor

J. Creager

By Knight Bros
Attys

The lumber is fed in by two rollers, C, of iron or wood, the latter material being preferable for the upper or face roller when the machine is intended to operate on stained lumber.

A roller, D, is placed under the polisher or slicker B in such a position that the board will first be bent slightly upward before passing under the said polishing-roller B, as represented, in order to counteract the tendency of the polishing-roller to warp the board in the opposite direction. For this purpose the center of the roller D is placed a short distance toward the feed end of the machine from the center or vertical plane of the axis of the polishing-roller B.

The journal-boxes of the roller D slide in oblique slots E, inclined at an angle of about twenty-two and one-half degrees to the vertical, so that as the lumber compresses the spring G the roller D will be moved foward a distance proportional to the thickness of the lumber, and by this means provide room for a wider camber, and on the other hand permit a reverse action to take place with thin lumber, so as to bring the convexity of the stuff nearer to the slicker.

Two rollers, F F', serve to assist the feed-roller C, and to support the board on the delivery end. The upper roller, F', may be made of India-rubber, so as not to injure the polished side of the lumber.

All the lower rollers are provided with adjusting-screws H and springs or cushions G.

Suitable gearing is provided on the various rollers to insure their rotation in the directions indicated by the arrows, and at the proper speeds for the respective rollers.

I have found effective, and recommend, a peripheral velocity of the slicker equal to twelve times that of the feed-rollers. The upward stress of the support and pressure-roller is from twenty to one hundred pounds to each inch in width, depending on the condition and material of the stuff.

The effect of the machine on lumber run through it is to
86 compact and level the surface, so as to make it more durable, more ornamental, and more capable of receiving a high polish, either of oil or varnish, as a far less expenditure of time and material, and with a better result than is possible with stuff which has been merely planed and sandpapered.

I claim as new and of my invention—

1. The combination of hard polishing-cylinder B, yielding supporting-roller D, and suit of feed and delivery rollers C F F', arranged and adapted to operate substantially as and for the purpose set forth.

2. In combination with polishing or slicking cylinder B, the supporting-roller D, whose bearings rest on adjustable springs contained in oblique housings E, located to one side of the vertical plane of the slicker-axis, substantially as and for the purpose designated.

In testimony of which invention I hereunto set my hand.

JONATHAN CREAGER.

Attest:

GEO. H. KNIGHT.

HORACE E. JOHNSON.

87 COMPLAIN-TS' EXHIBIT G. POTTS' PATENT.

89 UNITED STATES PATENT OFFICE.

GEORGE POTTS, of Indianapolis, Indiana.

Clay-disintegrator.

Specification forming part of Letters Patent No. 384,278, dated June 12, 1888. Application filed August 15, 1887. Serial No. 246,944. (No model.)

To all whom it may concern:

Be it known that I, GEORGE POTTS, of Indianapolis, in the county of Marion, State of Indiana, have invented certain new and useful improvements in clay-disintegrators, of which the following is hereby declared to be a full, clear and exact description, sufficient to enable others skilled in the art to make and use the same.

My invention relates to machines for clipping or shredding raw clay as it is taken from the bed or bank, so as to disintegrate the same and enable it to be quickly tempered and reduced to proper condition for molding into bricks, tile, or the like. Prior to the use of this class of machines it was frequently the practice to subject the raw clay to a "weathering" process during the winter months and to complete its reduction thereafter by tedious treatment in the well-known grinding-pit. Were attempt made to pass the raw clay directly through a set of crushing-rolls and thence to a pug-mill for tempering it was found that the rolls not only failed to reduce the clay to the homogen-ous state desired, but, with wet sticky clays, tended to squeeze or compress the same into sheets during passage through the rolls, so that the proper tempering of the clay thereafter by the pug-mill or otherwise was seriously resisted or impaired. By cutting or clipping the clay into shreds, as distinguished from a mere crushing and squeezing action, the disintegration of the mass is not only more complete and homogeneous, causing the diverse strata or pockets existing in the clay-bed to be distributed through and through the product, but the shreds, instead of being compacted, are ruptured and left open to the easy penetration of the water by capillary attraction at the section faces, thus promoting the rapid and even tempering of the clay and accomplishing, substantially, in very brief time what the old weathering treatment required weeks to effect.

The invention relates more especially to that type of clay-disintegrators consisting of a set of rolls mounted in a common frame and positively revolved in opposite direction, one of the rolls having a series of cutter-bars projecting longitudinally therefrom at intervals about the surface thereof, so that in co-operation the clay is clipped or shredded by the action of the cutter-bars as it is fed or advanced between and through the rolls.

The purpose of the invention is to reduce the power necessary to

(No Model.)

G. POTTS.

CLAY DISINTEGRATOR.

No. 384,278. Patented June 12, 1888.

Fig. 1.

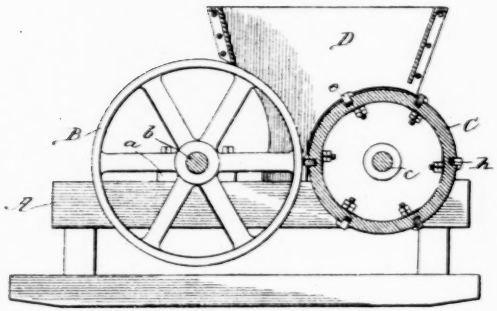


Fig. 2.

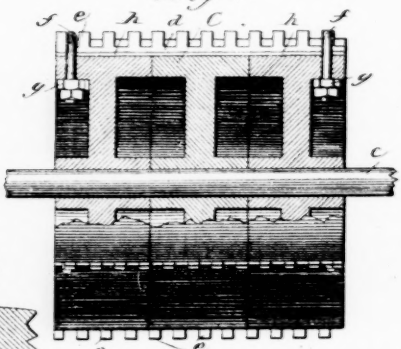


Fig. 5.

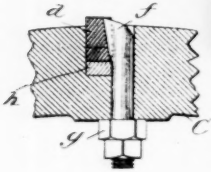
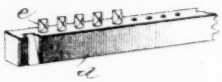


Fig. 4.



No. 394 Potts & Co. v. Creager et al. p. 88.

Witnesses.
W. Bowlby
F. Mills.

Inventor
George Potts
By Burton Parker
Attys.

drive the disintegrator, more especially in working wet sticky clays, or, what is the same in result, to reduce the resistance encountered by the cutting-bars in operation; and to this end the invention consists in providing the shredding-cylinder with cutter-bars of peculiar construction, and, also, in the combination, with such cylinder so provided, of a companion smooth-faced cylinder set in the same frame and positively revolved in opposite direction thereto.

The invention further consists of certain improvements in detail construction, all of which will fully appear from the description following, and be thereafter more distinctly pointed out in the claims at the conclusion thereof.

(Here follows diagram marked p. 88.)

In the accompanying drawings, forming part of this specification, figure 1 is a view in longitudinal section of a clay-disintegrator embodying my improvements. Fig. 2 is a detail view, partly in section and partly in plan, of the shredding-cylinder detached. Fig. 3 is a detail view, in section, showing the manner of securing the cutter-bars in place. Fig. 4 is a perspective view of a modified form of the cutter-bar.

Mounted upon the frame A, of any convenient construction suitable for the purpose, are the companion cylinders or rolls B C. These cylinders are preferably of cast-iron and have their axles *b c* journaled in suitable boxes or bearings, as at *a*, secured to the main frame A, thus permitting the easy revolution of the rolls B C during the operation of the machine. The cylinders B C can be geared and driven in any well-known way, a convenient and efficient means for this purpose being set forth in the patent of C. and A. Potts, for improvements in disintegrators, No. 368,898, dated August 23, 1887. It is merely necessary that the cylinders B C shall move in opposite directions, so as to advance the raw clay from the hopper D through and between the rolls at the same time that the cutter-bars *d* of the cylinders C are performing their peculiar function of shredding or clipping the clay. It is preferred that the cylinder B shall be somewhat larger in diameter than the cylinder C, and shall move at less speed than the latter, so that while the feeding of the clay occurs it will not be so rapid as to prevent the thorough shredding of the mass, which is desired. It is not essential, however, that the cylinder shall be of different size, and in some cases the proportions may be reversed, making the shredding-cylinder larger in diameter than the companion roll.

In the application of C. and A. Potts referred to the cutter-bars *d* each consist of a straight blade having a continuous edge set within a longitudinal seat or recess of the cylinder and securely retained therein with the cutting-edge projecting slightly above the face of the cylinder. By the present invention the cutter-bars, instead of presenting a single straight-edge to the face of the companion cylinder B, are indented, as shown, so as to form a series of teeth, *e*, projecting beyond the surface of the cylinder C. The indentations in the successive bars of the series about the circuit of the cylinder

are interspaced, so that the teeth of one bar shall stand opposite to the spaces of the next bar in the traverse of the cylinder.

In working wet sticky clays, when the cutter-bars have a continuous straight edge, the resistance encountered by the bars in course of their revolution from the clay very considerably increases the amount of power necessary to drive the machine at the proper speed for feeding and disintegration. By indenting the bars, however, as in the present invention, the resistance encountered is much lessened at the same time that the crowns or upper edges of the teeth act, as before, to clip or shred the clay in manner desired. Such parts of the mass of clay as remain uncut by the teeth of one bar are almost immediately thereafter shredded by the teeth of the succeeding bar, so that the result is to speedily disintegrate the clay, with the same benefit as was derived from the Potts machine, above named, at the same time that the resistance is lessened because of the indented nature of the cutter-bar. It is important that the bars shall be securely retained in position about the cylinder and be capable of easy removal when worn or broken. A convenient expedient for the purpose consists in beveling the face of each bar *d* near each end, and providing a bolt, *f*, with a corresponding bevel-face to engage with the bevel-kerf of the cutter-bar. The bar being inserted in its seat or channel in the cylinder C, the bolt *f* is thrust through a hole in the cylinder adjacent to the longitudinal channel and screwed down with its bevel-face bearing upon the bevel-face of the cutter-bar by means of the usual nut, as at *g*. A set-nut serves to lock the bolt firmly in place. It will be understood that this plan of securing the cutter-bars, although simple and compact, is not an essential. Any other expedient for holding the bars may be adopted and the advantages incident to the indenting of the bar be yet retained. A liner or packing, *h*, may rest in the channel or groove of the cylinder C below the cutter-bars *d*, to secure a firm bearing and ready adjustment for the bars, if desired. Instead of having the teeth *e* cut from the body of the bar *d*, this latter may be separate, as shown in Fig. 4, and the teeth *e* be secured therein by screw-shank or otherwise. In this construction the crowns of the teeth co-operate with the revolving cylinder B to clip or shred the clay, with the same result as if the teeth were in piece with the body of the cutter bar. Instead of having the teeth *e* mounted separate from the body of the cylinder C, such teeth may be set directly in the face of the cylinder itself, although such plan is inferior and is not to be recommended for the best results. It is evident that the cutter-bars, instead of extending in one piece longitudinally from end to end, may be made in sections, and may also be "staggered" across the face of the cylinder, if desired.

A set of clay-crushing rolls has heretofore been devised wherein the rolls were armed peripherally with a series of projecting teeth extending along the surface thereof; but in such device the projecting teeth were not furnished with cutting-edges to clip the clay, as in my invention, but had broad flat crowns, whereby the clay was merely reduced or crushed by a "pugging" action, and was not cut and shredded, as designed by me.

Having thus described the invention, what I claim as new is—

1. In clay-disintegrators, the combination, with a rotating cylinder having an abutting surface set opposite thereto and co-operating therewith to feed and shred the clay, of a series of teeth projecting beyond said cylinder and furnished with longitudinal cutting edges or crowns at the outer ends thereof, whereby the clay may be clipped or shredded as the same is fed by the cylinder, substantially as described.

2. In clay-disintegrators, the combination, with a rotating cylinder having an abutting surface set opposite thereto and co-operating therewith to feed and shred the clay, of the longitudinal bars retained by said cylinder, and the series of interspaced teeth projecting from said bars and beyond the surface of the cylinder, said teeth being furnished with cutting edges or crowns at the outer ends thereof to coact with the abutting surface and clip or shred the clay as the same is fed by the cylinder, substantially as described.

3. In clay-disintegrators, the combination, with the main frame, and with a rotating cylinder fixed therein and having longitudinal toothed cutting-bars projecting beyond the face thereof, of a positively-revolving companion cylinder fixed opposite thereto in said frame, and having a smooth face with which said cutting-bars directly co-operate to shred the clay as the same is fed between said cylinders, substantially as described.

91 4. In clay-disintegrators, the combination, with the main supporting-frame, of a rotating cylinder having longitudinal bars retained therein and a series of teeth projecting from said bars beyond the surface of the cylinder with cutting-crowns at the outer edges of said teeth, and a positively-revolving companion cylinder fixed in said frame, and having a smooth face with which the cutting-teeth directly co-operate to shred the clay as the same is fed between the cylinders, substantially as described.

GEORGE POTTS.

Witnesses:
LINDLEY VINTON.
CLAYTON POTTS.

92 THE UNITED STATES OF AMERICA, } ss:
Southern District of Ohio, Western Division, }

I, Benjamin R. Cowen, clerk of the circuit court of the United States within and for the district and division aforesaid, do hereby certify that the foregoing are true and correct copies of the exhibits, as marked, forming a part of the record in this court in the case of C. & A. Potts & Co. *vs.* Frank F. Creager *et al*, and being numbered 4244, now pending in the Supreme Court of the United States of America on appeal, the same having been inadvertently omitted from the transcript of record heretofore certified; and I further certify that the original drawing, a copy of which appears between pp. 26 & 27 of the printed transcript of record, has endorsed thereon, viz: "Complainants' Exhibit G." Nov. 7th, 1889. H. T., notary.

In testimony whereof I have hereunto set my hand and affixed the seal of the said court, at Cincinnati, O., this 16th day of March, A. D. 1894.

[Seal of the Circuit Court, South'n Dist. of Ohio.]

B. R. COWEN,
Clerk U. S. Circuit Court, S. D. O.,
By ROBT C. GEORGI, *Deputy.*

[Endorsed:] No. 4244. United States circuit court, southern district of Ohio, western division. C. & A. Potts & Co. *vs.* Frank F. Creager *et al.* Supplemental transcript.

[Endorsed:] Case No. 14,498. Supreme Court U. S., October term, 1893. Term No., 394. C. & A. Potts & Co., app't, *vs.* Frank F. Creager *et al.* Stipulation and addition to record. Filed Mar. 19, 1894.

Office Supreme Court, U. S.
FILED.
NOV 14 1894
JAMES H. McKENNEY,
CLERK.

IN THE

SUPREME COURT OF THE UNITED STATES.

C. AND A. POTTS AND CO.,
Appellant,
vs.
FRANK F. CREAGER *et al.*,
Appellees.

October Term, 1893.
No. 394.
IN EQUITY.

Appeal from the Circuit Court of the United States for the Southern District of Ohio, W. D.

BRIEF FOR APPELLANT.

ERNEST W. BRADFORD,
Solicitor for Appellant.

CHESTER BRADFORD,
Of Counsel.

INDIANAPOLIS, IND.

WM. B. BURFORD, PRINTER, INDIANAPOLIS.

(14,498.)

IN THE SUPREME COURT OF THE UNITED STATES.

C. AND A. POTTS AND CO.,
Appellant,
vs.
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October Term, 1893.
No. 394.
IN EQUITY.

Appeal from the Circuit Court of the United States for the Southern District of Ohio, W. D.

BRIEF FOR APPELLANT.

STATEMENT OF THE CASE.

This was a bill in equity, in the usual form, filed in the Circuit Court of the United States for the Southern District of Ohio on the 29th day of May, 1889, by appellant, a corporation duly organized and existing under the laws of the State of Indiana, and located in Indianapolis in said State, charging appellees, manufacturers of clay-working machinery and doing business as Jonathan Creager's Sons, at Cincinnati, Ohio, with the infringement of Letters Patent of the United States No. 322,393, issued to Clayton Potts and Albert Potts, on the 14th day of July, 1885; No. 368,898, issued to the same inventors on the 23d day of August, 1887, and No. 384,278, issued to George Potts, on the 12th day of June, 1888, each for a machine for disintegrating clay; which several letters patent had, before the filing of said bill, been duly assigned to this appellant. Subsequently to the filing of the bill, by stipulation between the respective parties, all reference to said George Potts patent, No. 384,278, was canceled, and the agreement made that said bill should be treated as if thus formally amended, leaving said bill alleging infringement of the first two patents only. On

July 24, 1889, appellees filed their answer, denying that they had infringed said letters patent or either of them; alleging that they were manufacturing clay pulverizers under authority of Letters Patent No. 380,245 and No. 385,342, granted to Jonathan and Harry M. Creager, and dated respectively, March 27, 1888, and July 3, 1888; alleging that such parts of said machines as were not of their own invention were old, and not covered by any letters patent, and, further, that appellant's patents disclosed no patentable novelty in view of the prior art as shown by numerous earlier patents to which reference was made. On the 28th day of August, 1889, appellant filed its replication, and on the 7th of November, 1889, made its *prima facie* case. After which, to wit: On the 11th day of January, 1890, appellees, pursuant to a stipulation, filed an amendment to their answer, making reference to numerous other prior patents and printed publications, and to an earlier use of an alleged anticipatory machine as further evidence of the want of patentable novelty in the machines of appellant's patents. The proofs were completed in the regular way, and the case was argued by counsel for the respective parties in the Court below, and afterwards, to wit: On the 3d day of January, 1891, an opinion was filed by the Honorable Court, and a decree entered dismissing the bill, from which decree this appeal is taken.

SPECIFICATION OF ERRORS.

The errors insisted upon in this Court are as follows:

1. That the court below erred in considering the exhibit "Model of Creager's Wood Polishing Machine," a pertinent anticipatory device, and competent evidence in this case.

2. That the Court below erred in its finding that the prior art contained substantially the mechanism of appellant's patents, and that the inventors herein only adapted these mechanisms to a new use, which required no invention.

3. That the Court below erred in its statement of the law applicable to the questions involved, and in its application of authorities, applying rules of law here that were made for conditions widely different from the conditions in this case, and

4. That the court below erred in dismissing the bill for want of equity. Such finding was contrary to the law and evidence.

BRIEF OF THE ARGUMENT.

Claim 6 of Patent No. 322,393 and Claims 1 and 2 of Patent No. 368,898 are the claims of the respective patents under which appellant sought by its proofs to maintain the allegations of the bill.

Both of said patents are for inventions in machines for performing the same function, the later patent being for an improvement upon the machine of the first patent, whereby its durability and efficiency is increased and its construction made less costly.

We maintain that Patent No. 322,393 is for a *pioneer* invention. It is the first patent ever granted for a machine capable of performing the work for which it is intended, and is a radical departure from anything shown in the prior art. The invention accomplished a great improvement in the art; or, it might even be said, was the *beginning of a new art*.

In support of this statement we call attention to the following testimony:

In the deposition of Geo. Potts (beginning on page 59 of the printed Transcript of Record) these questions and answers will be found:

Q. 4. How long have you been engaged in the manufacture of clay working machinery?

A. Nineteen years.

Q. 5. Do you know anything about the practical use and operation of clay-working machinery?

A. Yes.

Q. 6. Please state the extent of your experience in such matters.

A. I have been engaged in the manufacture of clay-working machinery, as well as setting up and using, for nineteen years.

Q. 14. How does the operation of the Potts Clay-Disintegrator differ from that of the roller crushers in result achieved, if at all?

A. The roller crushers leave the clay in sheets and in a compact solid form that will not absorb water readily. The disintegrator pulverizes and leaves the clay in a loose condition, absorbing the water rapidly.

Q. 15. Were you familiar with clay manufacture generally, and the machines used therein, prior to the production of this invention?

A. Yes, sir.

Q. 16. Were you familiar with any machinery prior to the Potts invention, capable, in your opinion, of performing the work and achieving the result of said invention?

A. No, sir.

Q. 17. As an experienced clay worker, how did you regard the Potts invention when you first saw it and witnessed its work?

A. As a *valuable improvement* in the working of clay—as in the pulverizing of clay.

Stephen K. Fletcher testified as follows (pp. 68–69, Trans. of Rec.):

Q. 2. How long have you been in the brick-making business?

A. About twenty years.

Q. 3. Are you familiar with clay-working machinery generally?

A. Yes, generally.

Q. 12. When the Potts machine was first put upon the market did you become acquainted with it?

A. Yes.

Q. 13. How did you regard it at that time?

A. I felt that it was a *great step* in the way of an *improvement* to perform the work which had not been thoroughly done before.

Thomas E. Chandler testified as follows (p. 17, Trans. Rec.):

Q. 4. Please state if you know anything of the practical use and operation of that particular clay-working machine known as the Potts Clay Disintegrator, as illustrated in Letters Patent of the United States, Nos. 368,898 and 322,393, to C. and A. Potts.

A. I have seen the machine in operation and I am somewhat familiar with its mode of operation.

Q. 5. Please state more fully the extent of your experience in the art of working clays and the machines used for this purpose.

A. We manufactured machinery for making drain-tile for fifteen or twenty years, which included crushers for crushing the clay.

Q. 11. How long have you been acquainted with the Potts machine?

A. I am not able to fix the time. I think I saw the first machine they had made.

Q. 12. What was your opinion of the value of the invention when you first saw it?

A. Well, I thought it was a *step greatly in advance of anything that had ever been done before.*

X-Q. 37. Did it strike you when you first saw a knife or beater in the periphery of the Potts roller that there was anything new in roller mills there?

A. I thought it was an *entirely new device for the purpose.*

X-Q. 38. Do you mean that the device was new or the use of it was new?

A. I had never seen anything of the kind used for that purpose. The use of knives or beaters in the cylinder would not be new, but *as adapted to that purpose and constructed in the Potts machine it was different from anything that I ever seen used.*

X-Q. 39. If there was any novelty in the Potts machine apart from the use of knives to beat clay with, will you please state what it was?

A. Well, I looked more at the effect it had upon the clay than the machine itself. *We were competitors* in clay-working machinery, and I thought they had something so much superior to anything we had, or so far as I knew, any one else had, *that it would supersede the use of crushing rolls entirely*, and it did not occur to me that the device was an old one that we could use or that any one else could use, because *we regarded it as the* ***Potts invention,*** and that they were entitled to whatever benefits there were in its manufacture and use.

J. J. W. Billingsly testified as follows (beginning on p. 78 Trans. of Rec.):

Q. 3. Are you familiar with clay working and the different processes employed in working clays and different machines employed in carrying out those processes?

A. Yes, sir, I think I am.

Q. 4. Please state the extent of any experience you have had by which you have acquired acquaintance or familiarity with such things?

A. I have been engaged in the publication of the journals referred to for the past twelve years. In that time I have made it my business to visit the various clay-working establishments, that I might be fully informed as to the machinery and methods of working clay for various purposes.

Q. 10. Please state the advantages afforded the art of clay-working by the Potts inventions at the time they were introduced, if, in your opinion, there were any.

A. The disintegration of the clay by the use of the Potts Disintegrator and the ease with which the clay after being disintegrated was mixed and thoroughly tempered made the introduction of this machine *a very great advance in the art of clay working and it was so considered by clay-workers*, and in my own opinion *no machine has so fully simplified the work of disintegration, mixing and tempering*, as the introduction of the Potts Disintegrator.

Q. 13. When did you first become acquainted with the Potts inventions?

A. I am not positive as to time; if my recollection serves me right, the first machine of theirs that I saw in operation was at their machine shop, not far from the Union Station, in

the winter of '86 and '87, I think, probably in the fore part of the year '87. I am not positive as to dates.

Q. 14. What was your own opinion of the machine, the character of the work it performed, as compared with other machines and other processes at the time you first saw it?

A. I was very favorably impressed, both with the character of the work done and the speed with which it was done. *I said at the time that it was a very great advance in the line of clay-working machinery.* Indeed, I considered it a MARVEL, and I have seen no reason to change my opinion in regard to it since the day I first saw it.

We claim for this patent all the rules of liberal construction which are accorded pioneer patents under the authority of numerous decisions of this Court, to which attention will be called hereafter.

Patent No. 368,898 is for improvements in the construction of the same machine. The result accomplished by the later machine in so far as its effect upon the clay is concerned does not differ from that of the machine of the earlier patent. The improvements were made as the result of months of experiment, and resulted in a machine less costly to build, more durable in use, and more effective in operation. That these improvements are sufficient to sustain the later patent we believe there can be no doubt, as we will endeavor hereinafter to more fully demonstrate.

THE INVENTION GENERALLY.

The invention is designed to perform the first step in the process of manufacturing articles from clay, and to reduce it to a suitable condition, after being taken from the bed or bank, for tempering and further manipulation. As is well known, clay beds or banks are made up of different strata, and in most clays the thorough mixing of said strata is not only a difficult, but is a very necessary step to be taken. Otherwise, the product will contain laminations and will shrink unevenly and check in burning, and scale or peel off in use, be ragged and less durable and valuable than products made of clays which are first thoroughly mixed and tempered and reduced to a homogeneous mass before being made into the product. Prior to the Potts inventions various methods had been employed to secure this result. The clay had been spaded up in the fall, and subjected to the action of the frost and weather during the winter months, and

further to the tedious action of the old-fashioned grinding pit. The "mud wheel" had also been used. The "soak pit" was another means employed to accomplish the result. The clay was deposited in a pit of water and allowed to remain until the soaking process had reduced it to the condition desired. These methods were slow, and consequently expensive. Grinding machines had been tried in comparatively recent years, and "crushing rolls" had been adopted. Their action was simply to crush the clay; the different strata being pressed together and made more compact, the clay being discharged from the rolls in cakes or sheets, which condition was one that made tempering very difficult, as the clay thus treated would not readily receive or absorb water.

See the following testimony of George Potts, beginning on page 59, Trans. of Record:

Q. 13. Prior to the introduction of this machine, what character of machinery had generally been used to do this work, if any?

A. Roller crushers.

X-Q. 57. You say that about eighteen or nineteen years ago crushing rolls were first used, so far as you know, for disintegrating clay. Prior to that time what was used, if you know?

A. The crushing rolls ***don't disintegrate clay;*** *they make it compact and harder to temper than before it is passed through them.* Prior to the use of rolls they used the tempering wheel, or the "mud wheel," some call them.

Thomas E. Chandler (p. 70, Trans. of Rec.) testified:

Q. 8. What machine or class of machinery had been used for the same purpose as that for which the Potts Clay-Disintegrator was designed prior to the Potts invention, so far as you know?

A. Crushing rollers, so far as my knowledge goes. The clay was passed between them.

Q. 9. How does the operation and result of the Potts Clay-Disintegrator differ from the operation and result of the crushing rollers?

A. Well, they are entirely different. Crushing between rollers puts the clay in a flaky condition, making a continuous cake of it so compact that it is difficult to get the water through it, and makes it hard to put through a die into any other shape, from the fact that the sides of it do not adhere to each other very readily. On the other hand, the Potts machine *tears the clay into fragments*, leaving it in good condition to take the moisture, or to mould it into regular or irregular shapes.

J. J. W. Billingsly (p. 79, Trans. of Rec.) testified:

Q. 7. Please state what machinery or class of machinery was used, within your knowledge, prior to the Potts inventions for doing the work which they are designed to do?

A. The disintegration of clays had received some attention before the introduction of this machine; it had been found desirable to crush the clay, at least, and for this purpose rolls were used of different diameters, and revolved so as to pass the clay between them, the distance apart of the rolls varying, sometimes a half an inch apart, or less, or more. The clays in passing between the rolls *came out in sheets*. The objection to this method of working clay was the difficulty of tempering the clay uniformly; the small cakes would very frequently pass into the pug mills, and through the pug mills and dies, forming what might be called laminations, which is *very objectionable* in the manufacture of ordinary clay goods. In tempering the clay with water the outside of the cakes or sheets of clay would become wet, while the inside would be practically hard, and the whole mass *unevenly tempered*, unless allowed to remain for a very considerable length of time in a soak pit. In the disintegration of the clay with the Potts machine clays may be worked *directly from the bank*, passing through all the stages of manufacture to the drying room.

Q. 8. Had any attempts been made by clay-working people, within your knowledge, to overcome the defects in the art which you have named prior to the Potts inventions? If so, please state.

A. The old system of disintegration and thorough mixture of clays was the old washer, used to wash clay until the water would hold clay largely in distension; it was then allowed to stand in a pool till the clay particles settled, the water being drawn off afterwards and the clay dried until the necessary plasticity to work it was secured. Another method of disintegration was to spade up the clays in the fall season of the year and allow the clay banks to "weather" until the disintegration was effected by the action of the air and frost and waters. I believe that grinding rolls had been introduced, one roll revolving more rapidly than another, to effect the same result; either process before named was expensive, and required a very considerable length of time to effect the disintegration desired. The last-named process of grinding has not been introduced, so far as I know, very successfully.

The need of a machine which would accomplish the result of finely dividing the clay, rapidly and cheaply, mixing the strata, and preparing it for effectual tempering, had long been recognized by those interested in the art. The disadvantages and defects of the means and methods known and used formed the subject of much consideration and discussion at conventions

of clay workers and manufacturers; and yet, prior to the Potts invention, no machine had ever been invented which would accomplish the desired result.

See testimony as follows:

George Potts (p. 61, Trans. of Rec.):

Q. 20. Please state as fully as you can the defects or objections in the old crushing rollers and the old method of reducing clay which were overcome and remedied by the production of the Potts Clay-Disintegrator.

A. My first experience with crushing rollers was with the manufacture of drain tiles. In manufacturing tile we experienced the trouble with clods and stones lodging and obstructing our dies. To overcome that trouble crushing rolls were invented. Then we found it difficult to temper our clay, that the clay would not absorb the water after passing through the rolls. Also a very serious objection that it made our tile machinery run heavy, causing breaks, and on account of the clay being rolled into a solid mass. Then, again, the tile was defective owing to laminations caused by passing through the rolls. The disintegrator overcomes these difficulties entirely.

Q. 16. Were you familiar with any machinery prior to the Potts invention capable, in your opinion, of performing the work and achieving the result of said invention?

A. No, sir.

J. J. W. Billingsly, (p. 80, Trans. of Rec.):

Q. 9. Was the question of simplifying, shortening or cheapening these methods of disintegration which you have mentioned one that had received any considerable attention or thought among clay-working people to your knowledge prior to the Potts inventions?

A. THE DISINTEGRATION AND MIXTURES OF CLAYS RECEIVED A GREAT DEAL OF ATTENTION BEFORE THIS TIME. THE BEST METHOD OF DISINTEGRATION, MIXING AND TEMPERING CLAYS WAS DISCUSSED VERY FULLY AT THE DIFFERENT CONVENTIONS THAT MET IN SEVERAL STATES FOR THE PURPOSE OF CONSIDERING SUCH QUESTIONS AS RELATED TO THE MANUFACTURE OF BOTH BRICK, TILE AND SEWER-PIPE.

Such was the state of the art when the Messrs. Potts made their first invention. The machines they invented consisted of a highly speeded roll, having longitudinal bars fixed in its periphery with sharp projecting corners, a fixed abutment in close proximity thereto, and a positive feeding device by which the clay was forced between said roll and abutment. The bars thus operated to strike the mass of clay quick, sharp blows in rapid succession, and cut or shred small portions therefrom, which portions were deposited beneath the machine, thoroughly mixed as to the different strata, and with rough, torn

or ruptured edges, a condition best adapted to receive or absorb water, and be easily and thoroughly tempered.

See testimony as follows:

George Potts (p. 60 Trans. of Rec.):

Q. 8. What experience have you had with this machine?

A. I have set up and handled the disintegrators, and they gave very good satisfaction. I know that they have proven to do their work well, leaving the clay in a condition that it absorbs water and tempers easily.

Q. 21. Please describe fully how and why the disintegrator overcomes the difficulties you have mentioned.

A. It leaves the clay in a soft, pliable condition, so that when forming in the moulds it leaves a solid mass of clay, and in drying and burning it will shrink evenly without checking.

J. J. W. Billingsly (p. 79, Trans. of Rec.):

Q. 6. Please describe the character of work this machine is intended to accomplish in clay working, its manner of operation, and the result in the art?

A. Well, the machine is intended to disintegrate the clay: it consists of a revolving cylinder with steel knives or bars set in the perimeter extending beyond—probably a quarter of an inch beyond the outer surface. There were two methods of feeding the clay against this cylinder; I am not familiar with the terms usually used by mechanics in describing these, and it is therefore necessary for me to describe it in my own way. In one instance they used the rolls in feeding the clay between the roll and the revolving cylinder, both revolving, but the one having the knives in it revolving much more rapidly. Another, the clay was fed in between the revolving roll having the knives and an apron, I call it an apron, disintegrating the clay as it passes through between the apron and revolving cylinder by means of the knives or bars. The result is a very thorough disintegration of the clay, separating the particles and mixing them evenly throughout. The clay coming in contact with this disintegrator is thrown quite a distance back and forth under the machine, unless carried directly by an apron into some other machine, pug mill or machine to press into brick or tile. In working clays it has been found that clay beds are usually composed of different strata of clay. In the manufacture of brick and tile it is found advantageous usually to thoroughly mix the different strata so as to secure uniformity in the goods manufactured. This disintegrator seems to effect or produce this result in a very satisfactory manner, where the clay is mined from top to bottom, as is usually done; the clay is thoroughly mixed, dries uniformly, and burns with less danger of damage, or cracking, in shrinking.

PATENT No. 322,383.

This patent is for a machine consisting of a suitable supporting frame having a cylinder provided with longitudinal grooves at suitable intervals, in which grooves are mounted heavy steel bars, the sharp, square corners of which projected a short distance beyond the surface of the cylinder. This cylinder is connected with suitable gearing by which it is driven at a high rate of speed. Set opposite to said cylinder is a heavy plate, the central portion of which is formed cylindrical in outline, which portion is in close proximity to said cylinder, and furnishes a rigid abutment against which said cylinder may act. Said plate is connected with mechanism by which it may be rocked on a shaft running through the center of its cylindrical portion. The upper wing of said plate thereby operates to feed the clay to the cylinder, which operates to clip or shred small portions from the mass of clay thus pressed against it by said wing, said mass being held in close relation to said cylinder by the central portion of the plate.

This machine accomplished the result sought. By its use the clay was finely shredded and reduced to a light, finely divided condition, with its various strata thoroughly mixed, in which condition it was best adapted to absorb the water, and be converted into that condition best adapted for further manipulation, to finally result in the most perfect clay product, with none of the "laminations" or defects common to the products made from clay prepared by the "roller crusher process." The result thus accomplished was an entirely new result for a machine: The result, so obtained, was one which had been long vainly sought after, as shown by the evidence before quoted.

The specification states that the invention is a new and useful improvement in "Clay Disintegrators," and then goes on to say:

"Our invention relates to an improved machine for finely dividing and tempering clay.

"The object of our improvement is to disintegrate the clay by means of a revolving cylinder, which shall remove successive portions from a mass of clay which is automatically *pressed* against the cylinder, as hereinafter fully described.

* * * * * * * * * * *

"A series of steel bars, *c c*, are fitted into longitudinal grooves in the periphery of the cylinder, where they are secured by flush screws at each end, or other suitable means, whereby they are

adjusted so as to present a sharp corner, *d*, Fig. 1, projecting above the surface of the cylinder. Opposite cylinder A a strong plate, D, is mounted on a shaft, *c*, so as to swing in bearings on the frame B. The central part, *f*, of said plate is cylindrical in outline. The upper portion, *g*, presents a straight surface, and the lower portion, *h*, presents to the cylinder a curved surface corresponding to the periphery of the cylinder. Plate D is caused to oscillate in its bearings by means of an eccentric wheel. * * * * * * * *

"The opposed sides of cylinder A and the upper and central portions of plate D form, together with sheet metal end plates, *s s*, which are secured to the frame, a trough, one side of which approaches and recedes from the other at intervals, and which has at the bottom a narrow opening, *t*, *of constant width*. * *

"Cylinder A, *revolving rapidly*, successive portions are removed from the mass of clay and carried through the opening *t* by the scraping bars *e*. At the same time the upper portion of the plate D moves *slowly* toward the cylinder, thus keeping the mass of clay in close contact with the cylinder as successive portions are removed. * * * * * * *

The finely divided clay, after passing through opening, *t*, falls upon the lower curved portion of plate D, and from thence to the incline *w*."

Claim 6, which is the claim of this patent which we believe has been infringed, is as follows:

"6. In a clay-disintegrator, the combination, with cylinder A, having a series of longitudinal grooves, of the scraping bars *e*, adjustably secured in said grooves, for the purpose specified."

The specification and the claim in this patent are awkwardly worded, and do not bring out the leading features of the invention as fully and clearly as they might have done. Appellant is thereby put to a disadvantage. We believe, however, that this Court will, if convinced that the invention is worthy of a patent, and is of a pioneer character, as we maintain, give a fair and liberal construction thereof which will afford appellant the protection to which we believe it is entitled.

Appellees' counsel and expert would read this claim as a claim for a cylinder armed with scraping bars, broadly, without reference to the character of the mechanism with which it is associated.

We regard this as a very unfair and untenable position. The claim is for the cylinder A having a series of longitudinal grooves, with the scraping bars *e* adjustably secured in said grooves, when combined in a "CLAY-DISINTEGRATOR," and "FOR THE PURPOSE SPECIFIED." The claim is, by these quoted words,

made dependent upon the specification and drawing for a clear understanding of its scope. It is not, however, necessary to read into the claim any element or limitation which is not there in express, although indefinite, terms. It is necessary to refer to the specification to define the term "Clay-Disintegrator," and to discover the purpose for which this peculiarly constructed cylinder is used in such a machine.

Claims should be construed in the light of the specification. We do not contend that the specification may be relied upon to furnish sufficient excuse for twisting the claim out of all semblance to its evident intent and meaning, but that where terms employed in the claim are indefinite or obscure as to meaning, the specification may be resorted to for a definition thereof, and that a proper understanding of what the claim means, must be obtained through the specification. This was clearly stated by this Court in *White* v. *Dunbar*, 119 U. S., 47 (30 L. ed. 303), as follows:

"The context may undoubtedly be resorted to, and often is resorted to, for the purpose of better understanding the meaning of the claim; but not for the purpose of changing it and making it different from what it is."

In *Yale Lock Co* v. *Greenleaf*, 117 U. S. 554 (29 L. ed. 952), this Court said:

"The scope of Letters Patent must be limited to the invention covered by the claim, and while the claim may be illustrated it can not be enlarged by language used in other parts of the specification."

In *Fay* v. *Cordesman*, 109 U. S. 408 (27 L. ed. 979), this Court said:

"The claims of the patent sued on in this case are claims for combinations. In such a claim, if the patentee specifies any element as entering into the combination, either directly by the language of the claim or by such a reference to the descriptive part of the specification as carries such element into the claim, he makes such element material to the combination, and the court can not declare it to be immaterial."

In the present case the inventors made a clay-disintegrator a part of the combination claimed, and under this rule it must be material, and the claim can not be construed as for a shredding cylinder alone.

In *Bates* v. *Coe*, 98 U. S. 31 (25 L. ed. 68), this Court said:

"The claims of a patent, like other provisions in writing, must be reasonably construed, and in case of doubt or ambiguity,

it is proper in all cases to refer back to the descriptive portions of the specification to aid in solving the doubt or in ascertaining the true intent or meaning of the language employed in the claims; nor is it incorrect to say that due reference may be had to the specifications, drawings and claims of a patent in order to ascertain its true legal construction."

In *Fuller* v. *Yentzer*, 4 Otto 288 (24 L. ed. 103), this Court said:

"Where the claim immediately follows the description of the invention, it may be construed in connection with explanations given in the description; and if the claim contains words referring back to the specification, it can not properly be construed in any other way."

See, also: *Brooks* v. *Fiske*, 15 How. 209 (14 L. ed. 665).
Lauther v. *Hamilton*, 124 U. S., 1 (31 L. ed. 325).
Terrell v. *Railway Co.*, 1 Wall. 491 (17 L. ed. 668).

We believe that it is unquestionably clear from the specification in this case that the term "Clay-Disintegrator" means a machine for finely dividing and tempering clay, consisting of the cylinder described, an abutting surface mounted in fixed relation thereto with a positive feeding device, and the necessary frame-work and gearing for supporting and driving the same. These are the essential features, and are shown to be essential by the language of the specification. In the portions of the specification above quoted it is stated that the object of the invention is to "*disintegrate the clay by means of a revolving cylinder which shall remove successive portions from a mass of clay which is automatically* **pressed** *against the cylinder.*" A positive feeding device is thus called for and made *an essential element*. In describing the "trough" formed by the upper portion of the plate D and the opposing portion of the cylinder, the specification states that it "*has at the bottom a narrow opening, t,* ***of constant width.***" This opening "of *constant width*" at the bottom of said "trough" makes it necessary that the abutting surface against which the cylinder operates shall be rigid, and in a fixed relative position to said cylinder. These elements are therefore essential to constitute a "Clay-Disintegrator."

The purpose for which this cylinder is designed in a clay-disintegrator is also clear from the specification. It is to *remove successive portions from a mass of clay*, to finely divide it. This is shown from the portions of the specification just quoted.

The term "adjustably" in said claim is one which seemed to give appellees' counsel and expert considerable trouble. It is perhaps true that the specification is somewhat faulty in describing this feature, but at the same time it contains sufficient description to enable the meaning to be clearly understood when considered in connection with the drawing. The only reference in the specification to "adjustability" of the bars is where it states that "they are secured by flush screws at each end, or other suitable means, whereby they are *adjusted so as to present a sharp corner, d*, Fig. 1, projecting above the surface of the cylinder." By reference to the drawing it will be seen that "liners" are clearly shown in the bottom of the grooves in which the shredding bars are mounted. It is obvious that by placing liners of greater or less thickness in the grooves, said bars may be adjusted to project a greater or less distance from the surface of the cylinder. We think it is perfectly clear that this is the significance which should be attached to the term "adjustable," but whether it means that the bars may be adjusted to project a greater or less distance, or are simply removable, is immaterial, inasmuch as appellees' machine has adjustable bars, which are also removable.

Having limited their claim to this cylinder in combination in a *clay-disintegrator* for the *purpose specified*, it is evident that the use of the same cylinder in a machine that was NOT a clay-disintegrator and for a purpose NOT that specified, would not be an infringement thereof.

In *Miller* v. *Eagle Mfg. Co.*, 151 U. S. 186 (37 L. ed. 26), the rule that "interchangeability, or non-interchangeability, is an important test in determining the question of infringement," is recognized, and also the rule that "that which infringes if later, anticipates if earlier." From converse reasoning it should follow that earlier devices which are not interchangeable, and which, if later, would not infringe, can not anticipate.

We believe, therefore, that this claim can not be held to be for the cylinder described, except in combination with a fixed abutting surface, a positive feeding device, and a suitable frame, and the gearing mechanism necessary to its operation; nor can it be anticipated by devices neither capable of performing the function of the machine claimed, nor suggestive of a machine which is, and which would not infringe the claim if they were later.

PATENT No. 368,898.

The principal improvement in the machine of this patent over the machine of patent No. 322,393 consists in substituting a smooth positively driven feed roll for the rocking feed plate, the same being mounted in fixed bearings to furnish the fixed abutting surface with which the shredding roll co-acts. It has the advantage of being a constant feeder as it moves toward the shredding roll constantly, while the rocking plate moved back and forth, and did not press the clay against the shredding cylinder except at its forward movement. The feed roll also affords a constantly changing surface, the wear being thereby distributed evenly throughout its entire circumference, while with the plate, the wear was constantly on one portion, which soon become flat, and the effectiveness of the machine was thus impaired. This machine proved to be the perfect machine for the purpose. Every machine since manufactured for this purpose has been substantially a duplicate of the machine shown in this patent. True, appellees and others have made trivial and apparently inconsequential changes in the details of construction, but when completed the machines can hardly be distinguished one from the other.

The prior art abounds in machines where two rolls operate together for grinding, crushing and reducing in various ways, but it shows no machine adapted to perform the function of this machine, nor does it show any machine which if so reconstructed as to be adapted to perform the function of this invention, would not be destroyed for its original purpose.

It seems strange, in view of the extreme simplicity of the invention, and the great need long recognized by those skilled in the art for such a machine, that it should not have been thought of before. It seems strange that these inventors, skilled in the art, and engaged in the manufacture of clay-working machinery, should first have devised the crude, imperfect and complicated feeding device of patent No. 322,393, when the feed roll was a matter of common knowledge, and one which it would now seem should have been the first to have suggested itself.

By the testimony of Albert Potts (R. D. Q. 28, p. 91, Trans. of Rec.) it is shown that they first undertook to disintegrate clay with this shredding cylinder in combination with a stationary apron and bar set close to it, but that they could not

get a particle of clay through the machine, as they had no means for feeding the clay against the cylinder. He says:

"The clay simply laid on top of the stationary bars, and as we fed the clay into it it gradually filled the hopper and covered over the roller. We possibly kept the belt on this machine an hour or more, and then gave it up, concluding we would have to make or devise some means to force the clay against the cutting roller."

Geo. Potts testified on cross-examination (X-Q. 69, p. 65, Trans. of Rec.):

X-Q. 69. View that comparison in another way; assume the two Creager rollers that are now placed vertically one to the other to be placed horizontally, as shown in the Potts model, with an appropriate hopper over them, would the Creager model then disintegrate clay, and would it disintegrate damp clay?

A. My experience has been that damp clay can not be fed through a disintegrator unless some force feed is applied.

This evidence is conclusive that a clay disintegrator must have a positive feeding device, and without said positive feeding device no machine would be a clay disintegrator.

The superiority of the roll, as a feeding device, over the rocking apron or plate can not be disputed, but it is contended that there was no invention in substituting the roll for the feeding device of the earlier patent, as rolls had been used for such a purpose before.

It is submitted, however, that in no instance shown by the prior art does it appear conclusively that a roll would be successful as a feeding device *in a clay-disintegrator*. Clay is of a peculiar character, different from the character of any material which the machines of the prior art were intended to operate upon. Had the Messrs. Potts undertaken to build a grinding mill, or a crushing mill, no doubt the companion feed roll would have been the first device they would have tried for the purpose. They started out to build a clay-disintegrator: Not a crusher—not a grinder,—but a machine which should operate continuously to clip, cut or shred small particles from a mass of clay, whereby its laminations should be destroyed, and it should be put in condition to readily temper and produce the perfect product. They were in a *new field*, without a single guide or suggestion in the prior art of what character of machine would accomplish this result. They first invented the

shredding cylinder. They experimented with this in combination with a fixed bar and apron. They found that the clay would pile up on said fixed bar and apron, and form an arch over the cylinder. That for this reason they could not get the clay through the machine. It was evident, then, that a feeding device must be employed. Had no invention been required to adopt the positively driven companion feed roll, is it not reasonable that they would have at once adopted it? They were both mechanics and manufacturers; men familiar with the use of rolls for nearly every purpose to which they had before been put: But because of the novelty of the machine, the different character of the material which they proposed to operate upon, the different operation to which they proposed to subject the material, the different result to be produced upon it from any that was shown in the prior art, it is evident that *experiment* alone could demonstrate the character of a feeding device best adapted for the purpose. To the work of discovering this device, these inventors applied themselves. A series of experiments resulted in the production of the rocking plate. This was successful in most kinds of clay, but was not perfect. (Albert Potts, R. D. Q. 28, p. 91, Trans. of Rec.) Notwithstanding this fact, they manufactured and sold quite a number of them during the years 1884 and 1885 (George Potts, X. Q. 44, p. 63, Trans. of Rec.), and it was several months, at least, before they devised the double roll disintegrator. (Geo. Potts, X. Q. 50, p. 63, Trans. of Rec.) This is but another instance of the history of many important inventions which, when a stage of perfection has been reached, seem so simple, and to so closely resemble prior devices for other purposes, that it seems almost incredible that the great need for such an invention, long existing and recognized, should not have been supplied by this identical machine. But the fact remains that it was not supplied; that the prior art contains nothing before the first Potts' invention capable of performing this result; and we believe that the second Potts' invention, although seemingly so obvious an improvement, yet, when considered in the light of the history of the invention, the months of manufacture and use of the less perfect machine, and in view of the novelty of the field in which these inventors were working, is amply sufficient to sustain the claims and warrant the grant of the patent.

The specification of this later patent is very full and clear; the claims are definite and well drawn. The specification clearly defines the difference between the machine of this patent, and that of the earlier. It states:

"Our invention relates to disintegrators of that class employed in the preparation of clay for the manufacture of brick, tile, and the like; and it consists more especially of certain improvements in the construction of disintegrators, such as is set forth in our Letters Patent No 322,393, dated July 14, 1885.

"In lieu of the swinging plate shown by said patent cooperating with the revolving cutter-cylinder, we design to employ a plain cylinder set oppositely to the cutting-cylinder and revolving therewith in close proximity, so that the raw clay may be fed, shredded, and discharged in an even and continuous manner, in readiness to be taken directly to the pug or other mill. * * *

"Within the usual boxes and bearings, *a*, of the frame A are seated the axles, *b* and *c*, of what may be termed for distinction 'feed-cylinder' B, and the 'cutting-cylinder' C, although, as will hereinafter appear, the cylinder B not only feeds the clay, but presents it for cutting, while the cylinder C not only cuts the clay, but co-acts with the cylinder B in feeding the same continuously through the machine. These cylinders are preferably of metal, and are arranged in near relation to each other, so that the clay passing between them shall be finely divided or shredded. For this purpose the cutting-cylinder C is provided about its face with a series of cutter-bars, *d*, which, in the form shown, consist of straight steel plates set in the channels or longitudinal grooves of the cylinder C. There may be liners of soft metal arranged in the cylinder seats below the cutter-bars, *d*, to secure an even bearing and adjustment for said bars. * * * * * *

"It is manifest that by having the bars removable, as shown, they may be taken out when worn or broken and new ones substituted in place thereof. Slight inequalities in the wear of the cutter-bar *d* may be compensated by the use of the liners, as above indicated. Instead of having the bars replaceable, they may be cast in piece with the cylinder C, although such form is not to be preferred, because on wear or breakage of the projections *d* the entire cylinder must be dispensed with. Instead of having the cutter-bars straight and mounted in longitudinal channels across the entire length of the cylinder C, such bars may be short and set in staggered or zigzag fashion across the face of the cylinder. Whatever kind of cutter-bars *d* be adopted, the purpose is to arrange such bars so as to project slightly from the face of the revolving cylinder C and barely clear the face of the opposite cylinder, B. Under this arrangement, as the cylinder revolves, the bars *d* cut away the clay in successive shred-like portions as the same is pressed

against the cylinder. It will be understood that the diameter of the feed-cylinder B may be larger or smaller than that of the cutting-cylinder C, or, again, that both cylinders may be of the same diameter. By having the cutting-cylinder C smaller in diameter than the feed-cylinder B the cutting-cylinder may be caused to revolve more rapidly than the companion cylinder B, to effect an even feed at the same time that the cutters *d* are presented in quick succession to more finely shred or divide the passing clay.

* * * * * * * * * * * * *

"As before stated, the machine shown in our Letters Patent No. 322,393 was provided with a swinging or vibrating plate, to co-act with the cutting cylinder in effecting the shredding of the clay which was fed between them. In such a machine the abutting surface of the vibratory plate furnished a rest or bearing for the clay, in presenting the same to the action of the cutter-knives. This abutting surface was limited in extent and unchanging in position, so that it became rapidly worn. By substituting the revolving roll for the vibrating-plate this objection is greatly lessened. The roll constantly presents new surfaces to the cutters, so that the wear is even and regular throughout its circuit. If any inequalities exist in the roll at the outset, these become rapidly reduced, so that by use the cylinder wears more and more true, and acts thus with constantly better effect. Aside from cheapness in construction, the revolving-roll or cylinder machine will work wet or sticky clay with perhaps one-third of the power necessary in treating such clays in the vibratory-plate machine. Such plate tends constantly to crowd or squeeze the passing clays, whereas the revolving-roll yields continuously, so that clogging is less apt to occur at the same time that the clay is finely and evenly shredded, the cutter-cylinder moving, by preference, more rapidly than the companion feed roll in order to accomplish this effect."

Claims 1 and 2 of this patent, relied upon by appellant in this suit, read as follows:

"1. In the supporting frame of a clay-disintegrator, a rotating cylinder longitudinally grooved and carrying cutting-bars in and projecting beyond the grooves, in combination with a smooth-faced rotating cylinder adapted to carry and hold the clay against the cylinder having the cutting-bars thereon, which latter cut or shred the clay and pass the same between the cylinders, substantially as set forth.

"2. In clay-disintegrators, the combination, with the main supporting frame and with a rotating cylinder fixed therein and having longitudinal cutting-bars projecting beyond the face thereof, of a positively-revolving companion cylinder fixed opposite thereto in said frame and having a smooth face or

surface, with which said cutting-bars directly coöperate to shred or clip the clay as the same is fed by and passed between said cylinders, substantially as described."

Claim 1 is clearly distinguished from the construction of Patent No. 322,393 in that it is limited to the "smooth-faced rotating cylinder adapted to carry and hold the clay against the cylinder having the cutting bars thereon."

Claim 2 is distinguished from Claim 1 in that the shredding cylinder is not limited to the particular construction set forth in Claim 1 and in the earlier patent, but covers a shredding cylinder formed with its cutting bars in piece therewith, or separably formed and attached thereto in any manner or by any means in combination with a "positively revolving companion cylinder fixed opposite thereto, and having a smooth face or surface with which said cutting bars directly coöperate to shred or clip the clay."

The specification above quoted states "instead of having the bars replaceable, they may be cast in piece with the cylinder C." Such a construction, *in combination with the smooth-faced companion roll*, whereby a machine is adapted for cutting and shredding clay, is not anticipated in the prior art. The claims are of different scope, and the combination of each is new. We therefore believe that this claim also is entitled to be sustained.

THE PRIOR ART.

Many patents were cited in respondents' answer, and amended answer, but the following are the only ones depended upon in their proofs to maintain the allegation of no patentable novelty in the Potts patents:

Patent No. 49,714 to Butterworth is for an apple grinding machine consisting of a cylinder armed with knives on its periphery, having serrated or tooth edges, which form "chisel-shaped" cutting projections. The apples are held to the cutting cylinder by a series of "pressure plates," which are held in position by springs. This patent does not anticipate the Potts inventions, as it is totally incapable of performing any function of a clay-disintegrator. The specification states that the knives are formed with "chisel-shaped edges." While we do not pretend that to merely increase the size or strength of a part involves invention, yet we do maintain that

when such a change effects a new and useful result which could not be produced by the original form, and was not suggested thereby, it is material. But this is the least of the differences between the Butterworth cider mill and the Potts clay-disintegrator. The Butterworth machine has *no fixed abutment* against which the cutting roll can act, which has been shown to be an essential element of the clay-disintegrator. The pressure plates are *hinged* and *spring mounted*. But even if they were rigid and fixed in a certain relative position to the roll, the machine would still make a much less perfect clay-disintegrator than the first machine tried by the Messrs. Potts, as described by Albert Potts (R. D. Q. 28, p. 91, Trans. Rec.), because it would not have a shredding roll adapted to the purpose. And this first machine experimented with by the Messrs. Potts was no clay-disintegrator at all, because it would not disintegrate clay. A positive feeding device was necessary. Such a device is not hinted at in the Butterworth patent.

(Expert Bond, p. 93, Trans. Rec.)

Appellees' counsel in his argument and brief before the court below made great effort to use appellant's patent No. 384,278, "complainant's exhibit George Potts patent," to assist him in his endeavor to show that the Butterworth patent is a good anticipation of the Potts inventions. This patent was included in the Bill of Complaint originally, and was afterward dismissed therefrom by stipulation. Appellees' counsel endeavored to make it appear that the motive for this act was disclosed in the information afforded us by his answer revealing the existence of the Butterworth patent, which he seems to think is for the same thing as this George Potts patent. In this he is in error, and a better motive is more clearly apparent. The George Potts patent is for a specific improvement over the prior inventions of C. and A. Potts, for a particular use and purpose. In working heavy, sticky clays a great deal of power was required to drive the shredding bar of the C. and A. Potts machines through the mass of clay as it struck the mass throughout its entire length. George Potts, who was their Superintendent, as is shown by his deposition, conceived the idea of dividing up the cutting bars, or cutting notches in them, and arranging them so that the cutting portions of one would follow the notches in the other; thus, while reducing the capacity of the machine (as it required a blow from two bars, one following the other, to remove the portion of clay upon

the mass that had been removed by the single bar of the C. and A. Potts machine), it also accomplished the purpose for which it was designed, as only half of the resistance, or possibly a little more, was offered to each cutting bar. The claims in the patent were limited to the specific improvements. When the bill was filed, we were informed that the infringing machine probably contained these improvements. This patent, therefore, was included in the bill. After seeing the Creager machine, illustrated by the drawing between pages 26 and 27, Transcript of Record, we discovered that it did *not* contain the improvements of this patent. We could not, therefore, justly or profitably prosecute this branch of the suit, and corrected the error as soon as possible after its discovery. Appellees' counsel, however, has given this matter so much prominence that we have felt compelled to make this statement. We wish here to emphasize the fact that it is not because of the serrated condition of the Butterworth knives that the Butterworth patent fails to anticipate the Potts invention; nor entirely because of the fact that they are of a form and condition totally unfit to shred clay, but principally because of the fact that the patent fails to show essential features *other than* the shredding roll, viz., the *rigid abutment* in a fixed position relative to the cutting cylinder, and the *positive feeding device*. If the Butterworth machine required no other changes than the substitution of the cylinder of the George Potts patent for the cylinder it shows, to make it a successful clay-disintegrator, then the question would be widely different, and appellees' position would have a better basis. But the facts are different, as stated. For these reasons it is very plain that the Butterworth machine is in no sense, nor by any stretch of the imagination, an equivalent for the machine shown in the George Potts patent. (Expert Bond, R–D–Q 32, p. 119, Trans. of Record.)

Patent No. 225,976 to Ennis is for a machine for preparing paper pulp. It consists of a revolving cylinder armed with longitudinal knives, and a stationary plate also armed with knives mounted beneath it in close proximity thereto. Rags fed between the revolving and stationary knives are cut to pieces. The reasons given why the Butterworth patent does not anticipate the Potts inventions apply with equal force in considering this patent. Besides these reasons, the knives are so close together that if they were of the proper size and

strength, and the roll was mounted in the place of the shredding cylinder in the Potts clay-disintegrator, the machine would be entirely useless, as the narrow spaces between the knives would retain the clay and soon become packed, making in effect another smooth roll. None of the essential elements of a clay-disintegrator are shown in the Ennis Patent. We hold, therefore, that it can not anticipate the Potts inventions. (See testimony of Expert Bond, p. 95, Trans. of Record.)

Patent No. 53,598, to Frost, is for another pulp grinder. It is a skeleton cylinder armed with sharp cutting blades; nothing else is shown. It contains no hint or suggestion that could possibly lead to or assist in the invention of the clay-disintegrator. (Expert Bond, p. 96, Trans. of Record.)

Patent No. 291,654, to Van Name, is for a novel construction of roll for grinding mills. It consists in making up the surface of the roll of alternate hard and soft strips of material. The surface of the roll is practically smooth, except that in use the soft material will wear more rapidly than the hard, and result in maintaining a corrugated roller until the strips are worn out. What possible value this patent can have as anticipating a clay disintegrator, we can not conceive. (Expert Bond, p. 97, Trans. of Record.)

Patent No. 92,997, to Peabody, is for a cotton-seed huller. It consists of a rotary cylinder armed with cutting knives set tangentially therein. Beneath the point of each knife is formed a concave portion in the cylinder. It operates in connection with suitably arranged stationary knives, and a serrated concave, to hull cotton seed poured into a hopper above. It is evident that if clay were subjected to the operation of this machine it would at once pack in the concave places under the points of the knives and no good result could be accomplished, even though it had the positive feeding device found to be an essential element of a clay-disintegrator, which it has not. (Expert Bond, p. 97, Trans. of Record.)

Patent No. 10,927, to Mayfield, is for a grinding mill, such as are adapted for general use among farmers. It consists of a rotary cylinder armed with a series of serrated or toothed "plane bits," which operate against a concave composed of stationary bars to grind the material fed between them. It has none of the elements or essential features of a clay-disintegrator; nor does it suggest a clay disintegrator in the remotest degree. (Expert Bond., p. 98, Trans. of Record.)

Patent No. 242,387, to Smith, is also for a grinding mill. It is almost the same in arrangement as the Mayfield patent. The cutting cylinder operating against a serrated concave instead of the bars. It has no more value as an anticipatory device, in this case, than the Mayfield.

Patent No. 160,618, to Rudy, is for a clay pulverizer. This is one of the attempts that had been made to pulverize clay by means of rollers prior to the Potts invention. The process employed was a *grinding* process. The rolls employed were *grinding* rolls. The whole idea of the inventor seemed to be to provide a machine to *grind* up the clay. Beyond this it discloses nothing, suggests nothing. It shows a series of "fluted" grinding rolls made up of a series of sections, or, in other words, substantially a series of cog wheels mounted on a shaft. There are a series of these rolls in the machine, arranged one above the other, with sieves between them. The action of the first roll, the specification states, leaves the material in a very coarse condition. It falls through the sieve below, which separates the large stones therefrom. It is more finely pulverized by the action of the next roll, and the next sieve separates a smaller grade of stones therefrom, and so on, until the desired result is reached. From the testimony of Albert Potts, heretofore referred to, it is shown that such a machine as this would be absolutely inoperative, except, perhaps, in clays of a *dry* nature and light consistency; clays that would not stick, and which are not so hard that the action of these small grinding rolls would have no effect upon them. It is evident that wet tenacious clays would simply form an arch over these rolls and would not be reduced at all. It simply shows a grinding mill, and could only be used on such material as is adapted to be ground. But few clays in their natural condition can be ground. It does not show a shredding cylinder or a cylinder adapted for the purpose for which the Potts cylinder is adapted. It does not show a fixed abutment against which any cylinder can act; but shows "spring plates" for supporting the material for the grinding roll to act upon, so that they may recede and permit the stones to pass through. Neither does it show any feeding device whatever. For these reasons we believe that this patent not only fails to anticipate any of the claims of the Potts patents, but also fails to suggest in the slightest degree the invention afterwards made by the Messrs. Potts, failing as it does to show any of the elements thereof,

or any of its characteristics, in operation or result. We, therefore, do not consider that this patent is an earlier patent which can in any manner detract from the pioneer character and value of these inventions, and the liberal and beneficial consideration to which they are entitled as such. (Expert Bond, p. 98, Trans. of Record.)

English patent No. 1,671 of 1874, to Cook, Bombroffe & Baker, is described as an improvement in clay mills. It simply consists in providing a cylinder with spiral ribs set comparatively close together on its circumference, and having spikes or studs projecting at intervals between said ribs from the surface of the cylinder. The specification states that "one or more of these rollers are employed in the mill." It does not give a description of the mill, or of the operation, except that it is used to pulverize clay, and "may be advantageously employed for the reduction of other substances." We presume it is simply a grinding or pulverizing roll. It can have no more weight or value as an anticipatory device than the machine shown in the Rudy patent. It could not operate as does the roll of the Potts patent, because of the spiral form of the ribs, even if they were otherwise adapted for the purpose. (Expert Bond, p. 100, Trans. of Record.)

Patent No. 61,932, to Gale, is for an old-fashioned straw cutter, showing a series of spiral knives supported in suitable heads around a shaft, and adopted to operate against a companion roll of raw hide to cut straw, hay and such matter. It is evident that this construction of cutting-cylinder could not be used in a clay-disintegrator; first, because the knives are of a spiral form and would not strike sharply against the mass of clay, as is necessary in order to cut or shred small particles therefrom; and also because the cylinder is of an open construction, and the clay would at once fill said cylinder to the shaft, the knives being entirely imbedded therein, which would clog and break the machine if it was attempted to move it. It is absolutely incapable of finely dividing and disintegrating clay by cutting or shredding small portions from a mass positively fed thereto as in the Potts inventions. Again, the companion cylinder is not held in a fixed relative position to the cutting cylinder, but is supported by coiled springs, which permit it to recede when hard substances are introduced. It therefore has no rigid abutment. (Expert Bond, p. 101, Trans. of Rec.)

Patent No. 33,119, to Whittemore, is also for a straw cutter.

The cutting knives are wide, and project a considerable distance from the shaft on which they are mounted. Otherwise this patent shows substantially the same construction as does the Gale patent. The "hide roll" against which the knives cut is also supported by springs, and has no fixed position in relation to said knives. For the same reasons that no anticipation of the Potts invention is found in the Gale patent, we also think there is no anticipation found in the Whittemore patent. (Expert Bond, p. 102, Trans. of Rec.)

Patent No. 57,280, to Blackie, is for a machine for pressing tobacco. It simply consists of a frame adapted to be packed with tobacco leaves; an endless apron which carries them forward between two pressure rolls, which press the tobacco into sheets or cakes, which are then carried forward beneath a cutting cylinder which has spiral knives with sharp edges on its periphery, and has a companion roll beneath, which supports the tobacco against the knives. The knives simply operate to cut the tobacco into strips or "plugs." Such an operation on clay would not accomplish the result which the Potts inventions do accomplish—that of cutting and shredding the clay into small bits, to mix the strata, and enable it to be easily tempered. These knives would simply cut the clay as it cuts the tobacco, and leave it in compressed cakes or strips, totally unfit for further manipulation, except by first putting it through a Potts disintegrator, or else subjecting it to some of the tedious and primitive operations practiced before that invention. We can not see, therefore, that this patent in any way anticipates the Potts inventions. (Expert Bond, p. 102, Trans. of Rec.)

Patent No. 116,039, to Fletcher, is for a pulp engine or crusher. Fig. 3 shows a cylinder provided with "depressions I on its periphery and revolving over a plain cylinder J." This apparatus is simply a crusher, nothing more. The cylinder with the depressions could not possibly be substituted for the shredding cylinder of the Potts inventions; nor could the Potts cylinder be substituted for the Fletcher cylinder. If it were attempted to use the Fletcher cylinder in a clay-disintegrator, the depressions, which are simply mortices in the face of the cylinder, would at once become packed full of clay, which the smooth cylinder would operate to firmly press therein. After the clay is properly prepared, this machine might, therefore, be useful as a brick moulding machine, but

it would never do as a clay-disintegrator. We do not, therefore, think that it is of any value or pertinency in this case. (Expert Bond, p. 103, Trans of Rec.)

Patent No. 125,159 shows a clay grinding machine in which there are two rolls having "double spiral" teeth which mesh with each other, between which the clay passes, and afterwards passes between two smooth rolls where it is still further crushed. This machine would be an effectual clay crusher, and is not essentially different from "roller crushers" in common use prior to the Potts inventions. They did not, however, nor would this machine, thoroughly mix up the different strata of the clay and leave it in a good conditon for tempering. It would be crushed, but its layers would only be more firmly packed together, and its condition would be so hard as to render it very difficult to properly temper by mixing with water. It does not accomplish the same work the Potts machine was invented to accomplish at all. It can not accomplish it, or be made to accomplish it without a complete reconstruction; and when so reconstructed it is totally unfitted for the purpose for which it was originally intended. It can not, therefore, be considered a good reference in this case. (Expert Bond, p. 103, Trans. of Rec.)

Patent No. 52,472, to Wells, is for a peat machine, its object being to prepare peat for fuel in a condensed state, for convenience in transportation, etc. The peat is introduced into a hopper and fed between two smooth rolls revolving at different velocities, which operate to grind the material, reducing it to a pulp. It is then carried to "molders," which are rolls having triangular depressions, those on one roll being arranged conversely to those on the other, so that when the depressions meet or articulate cavities are formed, whose sides are parallel. The pulp fills these depressions, and is formed into strips or cakes which are deposited on a traveling belt or platform which carries them to the drying ground. This patent does not anticipate in the remotest degree any of the claims of the Potts patents. (Expert Bond, p. 104, Trans. of Rec.)

Patent No. 297,764, to Case, is for a feed box for roller mills. It simply illustrates, in so far as its bearing in this case is concerned, a corrugated roll operating in conjunction with a smooth roll in a grinding mill; it could not disintegrate clay any more than the Potts machine could grind wheat. There is a clear distinction between a grinding roll and the cutting or

shredding roll of the Potts disintegrator—one has fine corrugations upon its face usually extending in a spiral direction around it, while the other is a smooth roll having heavy sharp-cornered bars projecting slightly beyond its surface at wide intervals, so that each bar will strike the mass of clay a quick, sharp blow, and remove therefrom a narrow strip or shred and deposit the same beneath the cylinder, and not become packed, as would be the case with corrugations, flutes or depressions.

Patent No. 231,512, to Voelk, is for the same character of mill, but shows two corrugated rolls instead of a corrugated and a smooth roll.

We do not think that either the Case or the Voelk patent can have any bearing upon this case at all, as neither of them shows a machine capable of performing the function of the Potts inventions, nor one answering the terms of the claims of the Potts patents. (Expert Bond, p. 105–10 , Trans. of Record.)

Patent No. 320,905, to Alsip & Drake, is for a clay crushing machine. This patent is dated June 30, 1885. The application on which Potts patent No. 322,393 was granted, was filed in the Patent Office April 25, 1885—more than two months before the issue of the Alsip & Drake patent. If this patent showed the same invention, therefore, it could not be a pertinent reference to the claims of said first Potts patent.

Figure 2 of the drawing best illustrates the machine. It is nothing but a roller crusher consisting of two smooth conical rolls C and D. A "muller" is mounted upon a pivoted frame above said rolls. It is simply a fluted or corrugated roll. The purpose of this muller is merely to break up larger lumps or clods as they are fed to the crushing rolls, and it is mounted on a pivoted frame so that it may move up and down automatically to permit the passage of stones and the like, and so that its pressure may be varied to suit the varying conditions of the clay. It does not operate in close proximity to either of the smooth rolls. The muller H is in no sense the shredding cylinder of the Potts invention. It does not operate in the same way, or for the same purpose, and is not capable of so doing. More than all this, the Potts shredding cylinder, if mounted in the place of the muller, would not accomplish the purpose of a clay disintegrator. It would be on a vibrating frame having no fixed relative position to a rigid abutment and feeding device. It would not be in sufficiently close proximity to the smooth roll to operate against it; and if it was so adjusted so

that it would be close to one of the smooth rolls and was mounted in rigid bearings, the relative position of the two would vary throughout the length as the smooth rolls are tapered, which would cause a constantly increasing width between them from the large end to the smaller, and totally destroy the effectiveness of the machine for the purpose for which the Potts inventions were made. It is not seen how this patent can be held to have any weight as an anticipatory device to the later Potts patent, and, as before stated, it is not pertinent as a reference to the earlier Potts patent, inasmuch as it was not issued for more than two months after the Potts application was filed. (Expert Bond, p. 107, Trans. of Rec.)

Patent No. 207,717, to Creager: This patent was issued September 3, 1878, to Jonathan Creager, one of the appellees herein, for an invention in wood polishing machines. It consists of a series of suitable feed rolls for feeding lumber through the machine; a polishing roll arranged intermediate of them, and a supporting roll for sustaining the lumber against the polishing roll. The rolls are all smooth. The specification says that this polishing roll may be made "either of metal, glass, bone, ivory or hard wood, and if of the former material it may be provided with corrugations which will facilitate the action of the roller in polishing." Nothing else in this patent indicates anything but a perfectly smooth roll. This language suggests only that a corrugated roll may be used. A corrugated roll is not the shredding roll of the Potts invention, and could not be substituted therefor. The machine shown in this Creager patent does not in the remotest degree suggest a clay-disintegrator, or a machine which could possibly be used as a clay-disintegrator. The supporting roll is *giddingly mounted;* and so this patent fails to show any "fixed abutment" which is a necessary element of the Potts inventions.

MODEL CREAGER WOOD POLISHING MACHINE.

Defendants have introduced a model exhibit marked "Respondents' Exhibit Creager Wood Polishing Machine," illustrating a machine the duplicate of that shown in the Creager patent above named, except that the polishing cylinder is provided with longitudinal grooves, and has glass bars mounted therein. In Jonathan Creager's own deposition (pp. 55 to 57, Trans. of Rec.) he testifies that he built a machine exactly like

the model, in the summer of 1874, which was used for half an hour, when it met with an accident and was broken. This testimony of Mr. Creager was corroborated by witness Stallo (p. 54, Trans. of Rec.). Witness Evans also testified that he saw a machine constructed by Mr. Creager similar to the model (p. 65, Trans. of Rec.). Evans' testimony is of no value, however, as he did not say when he saw it.

The Court below seemed to attach a great deal of importance to this model as an anticipatory device. In fact, from the reading of the opinion, it would seem that his Honor regarded it as the best anticipation in the case. In so doing, he must have overlooked some important facts to which his attention was carefully asked in our brief below.

By referring to Mr. Creager's deposition (p. 56, Trans. of Rec.), the following question and answer will be found:

"Q. 4. I observe that subsequently you took Letters Patent 'Respondent's Exhibit, Creager Patent,' for this construction of machine, but you omitted the glass scrapers or polishers from the drum. What I want to know is whether you considered that the patent covered that construction, whether they were mentioned or not."

"A. I was fully under the impression that that device was covered by these Letters Patent."

It will thus be seen that Mr. Creager's own counsel had him testify that the machine illustrated by the model was covered by the 1878 patent. In other words, that he regarded the machines as substantially identical.

Several peculiar facts readily suggest themselves here: As is well known, in order to obtain his 1878 patent, the application for which was filed July 26, 1878, Mr. Creager had to make oath that the machine forming the subject matter of the application had not been in public use for more than two years. In his deposition in this case, above referred to, he makes oath that he made and used the machine shown in the model in the summer of 1874, four years prior to his application for patent. Yet he testifies under oath that he was fully under the impression that this first machine illustrated by the model was covered by the 1878 patent. And it is not clear but what he is right in this impression, as the claims are quite broad, and might include, with the assistance of the specification, a polishing cylinder having its periphery armed with glass bars, as well as a corrugated cylinder, which the specification does

mention, as we presume, in the art of polishing, there would be no material difference between the operation and result of a metal corrugated roll and the wooden roll armed with the glass scrapers. This testimony and these facts show that Mr. Creager either swore falsely at the time he made his application for the 1878 patent, in regard to the question of public use, or that he regarded the 1874 machine in the light of an abandoned experiment, or, perhaps, as an incomplete invention —possibly the first step in producing the invention of the 1878 patent.

If it was an abandoned experiment it can not be of any value as an anticipatory device in this case, even though its construction is of that close relationship to the construction of the Potts machines that Judge SAGE seemed to regard it. We do not believe that had the machine been put into use in 1874, and been continuously used from then to the present time, in every wood-working establishment in the land, it could have any value as an anticipatory device in this case. We believe the facts are such, however, that the Court must hold this 1874 machine to be an abandoned experiment merely. The depositions above referred to show that it was used for half an hour; that perhaps fifty boards were run through the machine. This was sufficient to demonstrate the value of the machine. The accident to the machine consisted only of breaking some of the glass bars, because, as alleged, two boards were accidentally run into the machine, one on top of the other. To have repaired such a break would have required but little time or expense, and yet it was not done. Shortly afterwards, they testified, the mill was burned, including the machine. Had the machine been of any value is it not reasonable to suppose that another, probably many of them, would have been built? But such was not the case. So far as the testimony shows, the half hour's experiment was sufficient to satisfy everybody concerned with it, and they permitted it to rest in peace ever afterwards. So far as the history of the matter is revealed to us, it was abandoned, completely and eternally, unless the later patent is held to have resurrected it. In 1878 Mr. Creager made application and obtained Letters Patent on an improved construction. Glass bars, or a cylinder armed with bars of any kind, were *not mentioned* in the specification. If any further evidence were needed to demonstrate

that the first machine had been abandoned, this must be conclusive. Had the barred cylinder been of any value he surely would have taken more pains to have had his patent embrace such a construction.

Can a Court rightfully declare void patents for inventions which have taken a place in the art to which they appertain never filled by any prior machine; inventions which have achieved the highest success; inventions which *perform* the work for which they were intended—perfectly, rapidly, cheaply; inventions which have been recognized as of the *highest value* by all men interested in the art, and which are in such demand by users that manufacturers and dealers in such machinery are compelled to furnish them? Can such patents be declared invalid on such an anticipatory device as this—a machine that neither was, nor was intended to be, similar in construction, purpose, operation or result, and which was a total failure for the purpose for which it was intended, and was abandoned after a half-hour's trial, never to be tried again? Such a position is directly contrary to all the decisions of this court upon the subject from its organization to the present day; and we believe the Court below must have overlooked these facts in the testimony and these points made in our brief, and also at the oral argument, else he could not have committed this error.

The point made by his Honor that the substitution of steel for glass would not require invention, as a general proposition, we admit to be indisputable. But admitting, for the moment, for the sake of argument, that the machine made by Mr. Creager in 1874 was not an abandoned experiment, do not the Potts patents disclose more of difference than the mere substitution of steel bars for the glass bars? This can be answered by asking the question: Would the substitution of steel bars for glass bars in the alleged Creager machine make a clay-disintegrator thereof. There is but one answer to the question, and that is in the negative. It would be just as incapable of performing the function of a clay-disintegrator with steel bars in its polishing roll, as it would with glass bars. So would the Potts clay-disintegrator be totally unfit for polishing boards. An attempt to feed a board through the Potts clay-disintegrator would result—if it did not break the machine—in cutting and clipping said board into small chips. It would be

completely demolished as a board, and left in much the condition as the clay is left—well adapted to mix with water, and make a good wood pulp, suitable to be manufactured into products of that nature. It is, therefore, evident that the Potts inventions constitute more than the mere substitution of one material for another, even supposing the Creager 1874 machine was not an abandoned experiment. That it was, however, we believe has been clearly proven. (Expert Bond, p. 109, Trans. of Record.)

It is also pertinent to note the fact that Mr. Creager was a manufacturer of clay-working machinery; that he claims this machine which he invented in 1874 would disintegrate clay (X-Q's 7 and 8, p. 56, Trans. of Rec.); that instead of manufacturing this machine and selling them to his customers for clay-disintegrators, his firm purchased such machines from C. and A. Potts & Co., from November 24, 1886, to October 31, 1887 (Albert Potts, R-D-Q. 17, p. 89 Trans. of Rec.); that when they filed their first answer to appellant's bill, Mr. Creager had evidently forgotten that he had invented this same clay-disintegrator in 1874, as he made no mention of it in said answer; that he did not remember that he had made this same invention until after appellant had made its *prima facie* case, and that in order to get it into the case it was necessary to do so by an amendment to their answer at that late day (p. 28, Trans. of Rec.) The mere notice of these facts seems sufficient to show conclusively that the position taken that this old device can anticipate anything of the invention of the Potts patents, is not only untenable, but utterly absurd. It is not reasonable that Mr. Creager invented a clay-disintegrator in 1874, a machine which was then needed as much as it has been needed since, and threw the invention away; or that, had the invention been his own, he would, when his customers demanded a machine of this kind, obtain them from this appellant, until such time as it refused to furnish him more machines on account of the difficulty it had in collecting pay for those it had furnished him (Albert Potts, R-D-Q. 25, p. 91, Trans. of Rec.); or that he would have failed to remember that he was the inventor of this machine when he was first sued for infringement of the Potts patents.

The following language of Judge EMMONS, in the case of *Roots* v. *Hyndman*, 6 Fish. Pat. Cas. 439, is pertinent in this connection:

"It might be doubtful whether a man had the complainants' idea if there was no proof on the subject at all; but when you show that he *is engaged in the very department of production where it is most important*; see him *with the means in his hands to employ it if he knew how*; and for years manufacturing in a different mode, with less accuracy and at greater expense, then, upon any principle of action, this is *conclusive* that *this one man at least did not possess the idea*."

This case was appealed to this Court, and the decision affirmed. *Hyndman* v. *Roots*, 97 U. S. 348 (24 L. ed. 975).

The case of *Washburn & Moen Mfg. Co.* v. *Beat 'Em All Barbed Wire Co.*, 143 U. S. 275 (36 L. ed. 156) affords sufficient authority for our position that this alleged machine can have no value as an anticipatory device in this case.

We therefore think that our contention that the Court below erred in holding this device anticipatory of the Potts inventions and competent evidence in this case is fully sustained by these facts and the law applicable under such conditions.

Extracts from printed publications were also offered in evidence as anticipating the Potts inventions, as follows:

Figure 6,864, from Knight's Mechanical Dictionary, marked "Respondent's Exhibit from Knight's Dictionary, No. 1," and found in the Transcript of Record next to page 120 thereof. This is a machine for removing hair from hides; and the exhibit besides showing a cut of the machine contains descriptive matter, as follows:

"Figure 6,864 is a machine for removing hair from hides. It consists of a cylinder having cast upon it helical screw-blades, running from the middle of the cylinder to each end. Below this cylinder, which revolves upon a shaft, is another cylinder larger in diameter than the upper one, the shaft having its bearings in a frame. The two cylinders are caused to revolve by means of suitable gearing, the former revolving much faster than the latter; the latter may also be raised or lowered by means of cams on the shaft."

As will be noticed from the cut, the helical screw blades run more nearly circumferential than longitudinal of the cylinder. A hide introduced between the two cylinders being held against the blades by the cylinder beneath would no doubt be thoroughly scraped, as the blades would have a gradual, easy scraping action thereon, and the inclination of the knives being sufficient that the width of the strip covered by each will overlap the strip covered by those adjacent; but that such

a cylinder could *not* be used for disintegrating clay in the manner of the Potts inventions is too evident to need demonstration. The helical screw blades would simply imbed themselves with a gradual motion into the mass of clay, and operate only to cut the clay into cakes or strips, if it had any action at all. It is more than likely, however, that the clay would become imbedded between the blades beginning at the angles formed where they meet in the center of the cylinders, and gradually pack full until this scraping roll would simply be a smooth roll of no value whatever for the purpose. That the clay disintegrator would not scrape hides is also evident, which it would cut them into shreds and ruin them. (Expert Bond, p. 110, Trans. of Rec.)

Figure 262, marked "Respondent's Exhibit Extract from Knight's Dictionary, No. 2," and found in the Transcript of Record next to page 121 thereof, is a machine for grating beets and other roots. The exhibit shows a cut of a machine, and contains the following descriptive matter:

"Kluseman's Rasping Machine, figure 262, has a drum whose perimeter is furnished with radial blades. The roots are put into the hopper B, and passing downward are caught in flutes of the roller *c*, which makes one turn toward the rasp for every twenty-five revolutions of the rasp. Its duty is to hold the roots against the rasp, and these escape into the box beneath, when they are grated sufficiently fine to pass the throat-piece, which is adjustable from beneath. *a* is the cog-wheel which turns the roller *c*; the gearing of the rasp-cylinder on the axis *b* is hidden by the machine."

This machine is simply a large cylinder composed of end disks or frames which support the longitudinal rasping bars placed near each other, as will be seen from the cut. The fluted roller which feeds the roots to the rasp, as it is called, is mounted a considerable distance from said rasp, as will be noticed, and its surface is such that the space between it and the rasp is constantly varying. This cut does not, therefore, show the combination claimed in the Potts patents, or either of them, inasmuch as a fixed abutment is an essential element of a clay-disintegrator, as well as a shredding cylinder so constructed as to be adapted for the purpose.

The Court below, in considering the later Potts patent, said:

"Now, as to complainant's patent No. 368,898, every part of the combination there claimed is old. The rotating cylinder

longitudinally grooved and carrying cutting-bars in and projecting beyond the grooves, and the smooth-faced rotating cylinder employed as a feeder are all found in the prior patents in evidence."

It is true that the prior patents; for instance, the Butterworth, Ennis and others, show rolls with cutting knives in their peripheries; and that companion feed-rolls are shown in other patents. But that any single prior patent shows these features operating together, is not true. The combination and arrangement of these features constructed to operate as and for the purpose specified in the Potts patent named *was* new, and we believe the learned Judge erred in holding otherwise.

Not one of these prior devices shown in these earlier patents, printed publications, and evidence of prior use, succeeds, therefore, in establishing the allegation that the Potts patents disclose no patentable novelty in view of the prior art. We have shown conclusively, we think, that they are patents for machines which were designed to accomplish, and did accomplish, a work in the art of clay-working that had never been accomplished before by a machine, and a work that no prior known machine was capable of accomplishing. That the result accomplished was one of great value is shown by the testimony of witnesses heretofore quoted, and it is also shown by the testimony of *appellees themselves*, in their published testimonial to the trade forming part of their trade catalogue, a portion of which was introduced in evidence and marked "Complainant's Exhibit F." (First exhibit in Sup. Trans. of Rec.)

This is the testimony they thus bear to the value and efficiency of this invention, and the great and valuable improvement it constitutes in the art of clay working:

"Unlike the ordinary roller process, the action of the disintegrator is to remove small portions by *cutting* from the clay fed into the hopper on the same principle as shaving or whittling and *does not roll the clay into sheets, thus making it unfit for proper manipulation.* The past season we have put out many of these machines in difficult clays, and made it an obligation to work the clay both wet and dry, and each machine has done its work well and to the entire satisfaction of the purchasers. We guarantee each machine sold to do all, and just what we claim for it, and are willing to sell on such terms as are fair to both parties. In asking information of disintegrators, please state the nature of the clay to be worked and

the capacity desired, when we can give a prompt and intelligent reply. *By use of the disintegrator, no lumps go into the pug mill or brick machine*, and all stones are either separated or thoroughly ground. The action of the machine on stones is, if it be a round, hard stone, it will play on the cylinders until it receives a stroke from the bars that throws it out of the hopper; if the stone is one having corners it will be caught by the bars and ground up. Brick or tile made of disintegrated clay are more uniform and better tempered than by any other mode of preparation. There being no lumps or stones to burst them, and *the clay being so uniformly prepared, the faces of the brick are smooth and the shrinkage more equal*. THE SAVING IN BURSTED BRICK ALONE WILL SOON PAY FOR A MACHINE. Also, by its use, one man can supply clay to a brick machine for as high as 40,000 bricks daily."

Witness Geo. Potts testified on this subject (p. 60, Trans. of Rec.), as follows:

Q. 11. Have you ever seen the machine in actual use, and if so, to what extent?

A. I have seen them in actual use, numbers of them—300 or 400, I suppose, or more, that I have set up and started myself.

Q. 18. Do you know whether or not this machine went into public use readily, and if so, to what extent?

A. Well, we had some trouble in introducing them at first, being entirely new. Clay-working men, not understanding the principles of it, had to be convinced, by using, of its practical value.

Q. 19. Were you successful in convincing them of its practical value or not?

A. After using the machines they universally acknowledged their superiority over crushing rollers.

Q. 32. To what extent has the Potts Clay-Disintegrator gone into use?

A. I can't tell exactly, but they have gone—well, there are over a thousand of them in use, anyway.

Q. 33. How long have they been on the market?

A. About six years.

Q. 34. Do you know whether or not they have taken the place of other machinery in any instances?

A. I do. They have in many instances replaced other machinery.

Q. 35. What kind of machinery have they replaced?

A. Roller crushers.

And Witness Billingsly (p. 71, Trans. of Rec.) as follows:

Q. 11. Please state briefly the specific advantages which it seems to you the Potts' Clay-Disintegrator afforded the art.

A. First, in the thoroughness of the disintegration; second, the thorough mixture of the clay; third, the rapidity of the

work done; fourth, the uniform tempering of the clay secured by its disintegration; fifth, the better character of the ware or clay goods manufactured from the clay, on account of its uniformity of mixture and of tempering. I may add that the working of the clay is *direct from the bank* without difficulty.

Q. 12. Are these advantages such as would render, in your opinion, the manufacture of clay products less expensive and more economical, or not?

A. Yes, sir; they might be manufactured, I think, at less expense, and secure a better character of goods, with less loss.

The improvement in the art made by this invention is thus clearly established. It is shown that the function which it performs is not only a new one in the manner of operation and the effect of the operation upon the clay, but that the result accomplished is one of great benefit, and one the need of which has long existed without before being supplied. More conclusive evidence could not be had on this subject than that which is *furnished by appellees* through the medium of their trade catalogue, by which they testify to the whole world in the strongest language in support of the merits of this invention. They point out clearly its advantages in operation and result over anything that had been known before, distinguishing particularly between the result it accomplished and the result accomplished by the "roller crushers," which were the only machines in use prior to the Potts inventions by which it was attempted to reduce the clay preparatory to tempering it. Their testimony fully corroborates that of appellant's witnesses that the "roller crusher" left the clay in sheets or cakes, "thus making it unfit for proper manipulation;" that this machine thoroughly disintegrates the clay by removing small portions from the clay fed into the hopper "on the same principle of *shaving* or *whittling*;" that the product made from clay treated by this invention is of a better quality, being "more uniform and better tempered than by any other mode of preparation * * * * the clay being so uniformly prepared, the faces of the brick are smooth and the shrinkage more equal, and that the *saving in burned brick alone* WILL SOON PAY FOR THE MACHINE."

These facts are all so clearly established, not only by this testimony of appellees themselves, but by appellant's witnesses, George Potts, Fletcher, Chandler and Billingsly, from which testimony we have before fully quoted, that we think no doubt can be entertained concerning the great value of the

inventions forming the subject matter of the Potts patents, and the decided improvement and advance in the art of clay-working accomplished by them.

That these inventors have contributed something to the knowledge of the world; have achieved something not before known; have accomplished an important step in the progress of a very important and most useful art, is thus shown to be a fact beyond the possibility of a doubt. It is such inventors as these that the patent laws were intended to reward. It is patents for such inventions as these which this Court has uniformly, and in no uncertain language, sustained, and afforded to the owners thereof every measure of protection which the patent laws contemplate.

No such patent has heretofore been held invalid because older contrivances could be found which perhaps might resemble in physical form, but which were never intended to accomplish the purpose of the invention, and which never could be made to accomplish the purpose of the invention without material alterations and changes in their structure. The defense in this case shows no anticipatory patent or device which does not come within this category. Not one of them was ever intended to do the work which these inventions were made to do, and there is not one which possibly could do the work which these inventions successfully perform.

Counsel for appellant argued in the court below that many of the differences which we allege exist between the subject matter of the Potts patents and the anticipatory devices set up by them were not warranted by any matter in the patent. For instance, our expert, in his testimony has pointed out the fact, and given it considerable importance in his consideration of alleged anticipatory devices, that the bars in the shredding cylinder of the Potts patents are spaced considerable distances apart, so that each strikes the body of clay a quick, sharp blow as the cylinder rapidly revolves. He alleges, and we argued, and still insist, that shredding rolls with their bars or knives as close together as the knives shown in the Ennis patent, the Frost patent, and many of the other patents cited, would not be operative in a clay-disintegrator, because the clay would become imbedded between them, and not be discharged. But counsel for appellees argues that the specifications of neither of the Potts patents states how far apart the bars shall be, and that it is, therefore, immaterial. He loses sight altogether of the

drawings which form part of the specification, and which are equally competent with the descriptive matter, to disclose to the public or those skilled in the art the manner of constructing the practical operative machine.

"It is to be recollected, likewise, that the models and drawings were a part of this case below, and are proper to be resorted to for clearer information."

Hogg v. *Emerson*, 6 How. 438, (12 L. ed. 505).

Bates v. *Coe*, 98 U. S. 31, (25 L. ed. 68).

The machine must be constructed so as to accomplish the purpose, else it is of no value. The drawing is furnished to enable those skilled in the art to practice the invention. It being necessary to the practical success of the machine that the bars shall be so placed that each shall strike the mass of clay a quick, sharp blow independent of the other bars, and the machine being so clearly illustrated, it can not be said that this is not a material feature of the invention.

It will be noticed that appellees found no difficulty in copying the construction of the patents, and making a practical machine, as will be seen by reference to the drawing of their machine, found between pages 26 and 27, Trans. of Rec., and the illustrations of first exhibit in Sup. Trans. of Rec. Besides, the prior devices do not show the combinations of the Potts claims without this feature. It is not necessary, therefore, to rely upon it to distinguish the inventions from the old devices.

There are but few reported cases where the patent involved was so clearly for a pioneer invention as the first patent in this case. It is not shown, even, that a prior inventor had made any machine leading up to this invention. In many instances it happens that the perfect machine has been but the last step of many which has been taken toward the same end, and by many different inventors. The one who has finally reached the goal of success first; been first to accomplish the result sought, and first to give to the public the information necessary to enable the invention to be practiced, has been held to be the first—the pioneer in the art. In this case it was shown only that the need of the machine was recognized; that the need of something to accomplish the result had been the subject of discussion at conventions of people interested and skilled in the art (Q. 9, p. 80, Trans. of Rec.) But it is not shown that any attempt had been made by any one else to

construct a machine which would do it. The nearest thing was the "roller crusher," which operated upon an entirely different plan; was intended only to crush the clay, and produced an entirely different result.

Except "roller crushers" no other machine but that shown in the Rudy patent was intended to operate upon clay at all. That was simply a grinder. It could only operate on such clay as was adapted for grinding. Such clay is a very small per cent. of that used, as is a matter of common knowledge.

The prior devices, therefore, being incapable of performing the function of these patented inventions, containing no information which would suggest such inventions, never having been intended to perform the same or similar functions, and not being capable, without material alteration in their construction, of performing in any manner the same or similar functions, can not, we submit, anticipate inventions of such undoubted pioneer character, and of such great value to and improvement in the art to which they relate.

"Novelty is not negatived by anything which was neither designed, nor apparently adapted, nor actually used, to perform the function of the thing covered by the patent, though it might have been made to perform that function by means not substantially different from that of the patented invention."

Walker on Patents, Sec. 68.

"It is not enough to defeat the novelty of an invention, that prior contrivances are produced, which might, with a little change, have been made into the patented contrivance, though not so intended by the maker."

Cook et al. v. *Ernest et al.*, 5 Fish. P. C. 396; WOODS, 1872.

Erwin et al. v. *Dana et al.*, 9 O. G. 642; DRUMMOND & BLODGETT, 1876.

In the very recent case of the *Keystone Manufacturing Co.* v. *Adams*, 151 U. S. 139, decided January 8, 1894, this Court said, after admitting that the prior art disclosed contrivances closely resembling the invention of the patent:

"But, as we have seen, when the test of practical success is applied, the conclusion is favorable to the last patent.

"Where the patented invention consists of an improvement of machines previously existing, it is not always easy to point out what it is that distinguishes a new and successful machine from an old and ineffectual one. But when, in a class of machines so widely used as those in question, it is made to appear that at last, after repeated and futile attempts, a machine has

been contrived which accomplishes the result desired, and when the Patent Office has granted a patent to the succesful inventor, the courts should not be ready to adopt a narrow or astute construction fatal to the grant."

By the first Potts invention a much stronger case is presented in favor of the patent than was presented in the case of the Adams patent. The second Potts invention cured grave defects in the first, and achieved a practical success in all kinds of clay; and we believe that this decision, therefore, affords ample authority for our position that both patents should be sustained.

In the case of *Dobson* v. *Cubley*, 148 U. S. 117, (37 L. ed. 671), this Court sustained a patent for an improvement in banjos, where the improvement resulted in a benefit to the art, which seems very small when compared with the benefit accomplished by the Potts inventions to the art to which they relate.

In the case of *Krementz* v. *Cottle Company*, 148 U. S. 556, (37 L. ed. 558), the patent was for a stud. Its inventor had been the first to make a stud from a single, continuous piece of metal having a hollow and round head. Although the stud, when completed, performed no function different from that performed by other studs, yet the invention was a decided improvement in the art, and this Court justly sustained the patent. In that case this Court also said:

"The view of the court below, that Krementz' step in the art was one obvious to any skilled mechanic is negatived by the conduct of Cottle, the President of the defendant company. He was, himself, a patentee * * * for an improvement in the construction of collar and sleeve buttons. * * * Yet, skilled as he was, and with his attention specially turned to the subject, he failed to see, what Krementz afterwards saw."

So it may be said in the present case, that the view of the court below holding that the Potts patents did not involve invention, is negatived by the conduct of the Creagers, appellees herein. They were manufacturers of clay-working machinery; knew of the need of a machine to do the work of these inventions; the senior member of the firm had patented a machine years before which he believed included a construction which would do the work, if he had only thought of it. Yet, he failed to see it, and by his own act in purchasing machines from appellant, at once recognized the value of the inventions and the improvement in the art resulting from their creation.

In this same case the rule that the patented device having gone into general use and displaced other devices is sufficient to turn the scale in favor of the existence of invention is recognized.

We do not think the validity of appellant's patents turns upon any such narrow points as these, yet they all go to strengthen the case, and so we call attention to them.

In the case of *Topliff* v. *Topliff*, 145 U. S. 156 (36 L. ed. 658), this Court sustained a patent for a slight change in the form and arrangement of prior devices, inasmuch as a valuable improvement in the art had been thereby accomplished, and the improved device had gone into extensive use.

In the case of *Sessions* v. *Romadka*, 145 U. S. 29 (36 L. ed. 609), the patent was for a catch or lid fastener for trunks, which has gone into almost universal use and supplanted the old strap and buckle and other formerly known imperfect devices for the purpose. In that case the invention of the patent did not accomplish, strictly speaking, a new result, but accomplished the old result in a better and more effectual way, affording greater support, and increasing the durability of the article, while lessening its cost. Yet this Court held the inventor to be a pioneer in the art, saying:

"In view of the fact that Taylor was a pioneer in the art of making a practical metallic trunk fastener, and invented a principle which has gone into almost universal use in this country, we think he is entitled to a liberal construction of his claim."

* * * * * * * * * * * *

"There are none of these patents which contain the peculiar combination of the Taylor device; none which, had Taylor known of them, would have suggested his own invention."

The prior art showed trunk fasteners of various kinds, and some which the Court recognized as "intended to accomplish the same purpose."

Others had been in the same field striving to accomplish the same end, but had failed. Taylor succeeded. He was held to be a pioneer inventor, and the patent for his invention was held to be entitled to the liberal construction accorded such patents. That case differs from this in that the Messrs. Potts were the *first* in the field, with not even the guide or suggestion that imperfect devices, and incomplete inventions, and prior experiments of others, would afford; yet they succeeded, accomplished the result sought, and produced the perfect machine. While not wishing to detract in the slightest degree

from the credit due such inventors as Taylor, or belittle in the least the value of their inventions (for it matters not what imperfect devices the prior art contains, it is only the perfect one that can be of public benefit), yet we submit if there can be any distinction in the character of merit to be attached to different pioneer inventors and their inventions, then the Messrs. Potts and the inventions they produced are entitled to the greatest credit and to merit of the very highest order.

See, also, *Gandy* v. *Main Belting Co.* 143 U. S. 587 (36 L. ed. 272), in which this Court sustained a patent for an invention which simply accomplished a better and an improved result—not a new result.

In the case of *Washburn & Moen Mfg. Co.* v. *Beat 'Em All Barbed Wire Co.*, 143 U. S., 275 (36 L. ed. 154), in which the Glidden patent for the perfect barbed fence wire was involved and sustained, this Court said:

"It is true that the affixing of barbs to a fence wire does not apparently give a wide scope to the ingenuity of the inventor; but from the crude device of Hunt to the perfected wire of Glidden, each patent has marked a step in the progress in the art. The difference between the Kelly fence and the Glidden fence is not a radical one, but slight as it may seem to be, it was apparently this which made the barbed wire fence a practical and commercial success. * * * Under such circumstances courts have not been reluctant to sustain a patent to the man who has taken the final step which has turned a failure into a success. In the law of patents it is the last step that wins.

* * * * * * * * * * * *

But it was Glidden, beyond question, who first published this device, put it upon record, made use of it for a practical purpose, and gave it to the public, by which it was eagerly seized upon, and spread, until there is scarcely a cattle-raising district in the world in which it is not extensively employed. Under these circumstances, we think the doubts we entertained concerning the actual inventor of this device should be resolved in favor of the patentee."

As before stated, while we do not consider it necessary, in this case, to depend upon such narrow points to sustain the Potts patents, as they are for machines to which no near approach can be found in the prior devices in operation and result, or the purpose for which they are intended, yet the said patents being for perfect devices, which have gone into general use and supplanted other devices, they are entitled to the same consideration for these facts alone, and our case is thus strengthened.

In the case of *Morley Sewing Machine Co.* v. *Lancaster*, 129 U. S. 263 (32 L. ed. 715), the patent was for a machine for sewing on buttons. Morley was shown to be the first to produce a machine for automatically sewing shank buttons onto fabrics. The machine consisted of three different sets of mechanisms combined together to automatically feed the buttons, stitch them in place, and feed the fabric along, so as to space the stitches and the buttons. It was not the first machine for sewing on buttons, and of the three different groups of instrumentalities used neither of itself was broadly new. But the combination of said several groups of instrumentalities or mechanisms, by which a single machine was produced adapted to accomplish the entire work automatically *was* broadly new, and was a great improvement in the art. This Court said:

"Morley having been the first person who succeeded in producing an automatic machine for sewing buttons of the kind in question upon fabrics, is entitled to a liberal construction of the claims of his patent. He was not a mere improver upon a prior machine which was capable of accomplishing the same general result; in which case, his claims would properly receive a narrower interpretation. This principle is well settled in the patent law, both in this country and in England. Where an invention is one of a primary character, and the mechanical functions performed by the machine are, as a whole, entirely new, all subsequent machines which employ substantially the same means to accomplish the same result are infringements, although the subsequent machine may contain improvements in the separate mechanisms which go to make up the machine."

The claims in the Morley patent were of such a nature that they depended upon the specification for a clear understanding thereof, as does claim 6 of the first Potts patent. The prior art disclosed separate features and elements of the combinations claimed; yet the claims were sustained, the combination being for a new machine. In this decision the earlier decisions of this Court and of the English courts upon this question are cited and fully discussed.

It seems to us clear that this appellant is clearly entitled to the same liberal construction of its patents, as it stands exactly upon the same ground with reference to the art to which the inventions of its patents relate, as Morley stood with reference to the art to which his invention related. Its inventors *created* a machine never known before, and it did a work never done before by any machine, which work was of great benefit to and improvement in the art.

The decision of this Court in the case of *Consolidated Safety Valve Co.* v. *Crosby Valve Co.*, 113 U. S. 157 (28 L. ed. 939), is also one particularly applicable in this case. The patents involved in that case were for improvements in safety valves. The Court found that—

"Richardson was the first person who described and introduced into use a safety valve which, while it automatically relieved the pressure of steam in the boiler, did not, in effecting that result, reduce the pressure to such an extent as to make the use of the relieving apparatus practically impossible, because of the expenditure of time and fuel necessary to bring up the steam again to the proper working standard. * * * His patent of 1866 gave a moderate range of pressure, as a result of the proportions there specified, and his patent of 1869 furnished a means of regulating that range of pressure, by a screw ring, within those narrow limits which are essential in the use of so subtle an agent as steam.

"In regard to all of the above patents, adduced against Richardson's patent of 1866, it may be generally said, that they never were, in their day, and before the date of that patent or of Richardson's invention, known or recognized as producing any such result as his apparatus of that patent produces, as above defined. Likenesses in them, in physical structure, to the apparatus of Richardson, in important particulars may be pointed out, but it is only as the anatomy of a corpse resembles that of the living being. The prior structures never effected the kind of result obtained by Richardson's apparatus, because they lack the thing which gave success. * * * Taught by Richardson, and by the use of his apparatus, it is not difficult for skilled mechanics to take the prior structures and so arrange and use them as to produce more or less of the beneficial results first made known by Richardson; but, prior to 1866, though these old patents and their descriptions were accessible, no valve was made producing any such results."

It is submitted that every line of the last paragraph above quoted, with the substitution of the appropriate names and dates for those used, would be equally applicable to this case, and would as correctly state the facts. Before the date of the Potts inventions no apparatus was known or recognized as producing any such result as said inventions produce. Such likenesses as there are between the alleged anticipatory devices and these inventions are likenesses only as "the anatomy of a corpse resembles that of a living being." Taught by the Messrs. Potts, and by the use of their inventions, it would not be difficult for skilled mechanics to take the structures of these prior devices and remodel them so as to produce something of

the beneficial results attained by the Potts inventions. But, as such devices failed to anticipate the invention of the Richardson patents, so they must also fail to anticipate the inventions of the Potts patents.

In that same case, in considering one of the prior patents cited as anticipating the second Richardson patent, this Court said:

"The Webster patent shows a huddling chamber and a stricture. But the evidence shows that valves made with the proportion shown in the drawings of Webster work with so large a loss of boiler pressure, before closing, as to be practically and economically worthless. Webster's patent describes a means of making the area for the escape of steam adjustable. * * * But it does not show the screw ring of Richardson and its minute delicacy of adjustment and action."

Notwithstanding this close reference, this Court held, in view of the great improvement in the art and the beneficial result accomplished, that the Richardson patent was valid. In this we have the authority of this Court for our position that a difference in size, form or proportion, which results in affording a new function, which accomplishes a new result and an important improvement in the art, may be material. Because of the proportions shown in the drawings of the Webster patent its apparatus was seen to be practically worthless, in so far as performing the functions of the apparatus of the Richardson patent. So, in this case, the difference in the distance between the bars of the shredding roll of the Potts inventions and the bars of the machine shown in the Ennis, the Butterworth, the VanName, and many other of the prior patents, is a material difference, because of the fact that such difference lends to the device a function which the older devices did not have, and enables it to perform a result which it could not perform if constructed in accordance with the proportions shown in said old devices, its great improvement in and benefit to the art being thereby secured.

So, also, in that case, this Court construed and read the claims in the light of the specification, giving them reasonable and fair construction, reading them to cover the invention which it was clearly shown Richardson intended to cover.

The claim of the first Richardson patent read:

"A safety valve with the circular or annular flange or lip *e e* constructed in the manner or substantially in the manner shown, so as to operate as and for the purpose herein described."

This Court said that under such language Richardson was entitled to cover:

"A valve in which are combined an initial area, an additional area, a huddling chamber beneath the additional area, and a strictured orifice leading from the huddling chamber to the open air, the orifice being proportioned to the strength of the spring as directed."

The claim of Richardson's later patent read:

"The combination of the surface beyond the seat of the safety valve, with the means herein described, for regulating or adjusting the area of the passage for the escape of the steam, substantially as and for the purpose described."

This Court stated that Richardson was entitled to cover under this language:

"The combination with the surface of the huddling chamber and the strictured orifice, of a screw ring, to be moved up or down to obstruct such orifice, more or less, in the manner described."

The claim did not say anything about the screw ring. It referred to the "means herein described." This Court referred to the specification, and found out what such language meant, that the "screw ring" was essential, and construed the claim accordingly. So in the sixth claim of the first Potts patent, it is necessary to find out from the specification what is meant by the language employed; and we find that it means the combination of the shredding roller, as described in the claim, a rigid abutment, and a positive feeding device.

That decision seems, therefore, to furnish authority for the position we have taken on nearly every question involved in the case at issue, and with the *Morley Sewing Machine* case would seem to furnish all the authority that is needed to sustain our various contentions. We will, however, call attention to a few other decisions we consider in point.

In *Webster Loom Co.* v. *Higgins*, 105 U. S. 580 (26 L. ed. 1177), in considering the invention, the sufficiency of the specification, and the state of the art, this Court said:

"Turning now to the invention claimed by Webster, and described in the patent under consideration, we find, although it produced a great improvement in the art of weaving pile fabrics, yet as actually exhibited in conception and accomplishment it seems simple. The thing to be done was to combine the advantages of Bigelow's rigid lathe, divested of some of its defects, and his constant command of the wire, with Weild's

trough or wire bar for supporting the wire. * * * Very little modification had to be made in the claims, and the whole apparatus or wire movement, as it is called, seems more simple than it was before, either in Bigelow's or Weild's loom. This contrivance, when actually applied to the looms, worked to perfection and enabled the weaver to drive his loom to its utmost capacity.

* * * * * * * * * * *

"It is further argued, however, that supposing the devices to be sufficiently described, they do not show any invention; and that the combination set forth in the fifth claim is a mere aggregation of old devices already well known and, therefore, it is not patentable. This argument would be sound if the combination claimed by Webster was an obvious one for attaining the advantages proposed, one which would occur to any mechanic skilled in the art. But it is plain, from the evidence and from the very fact that it was not sooner adopted and used, that it did not, for years, occur in this light to even the most skillful persons. It may have been under their very eyes, they may almost be said to have stumbled over it; but they certainly failed to see it, to estimate its value and to bring it into notice. * * * We can not yield our assent to the argument that the combination of the different parts or elements for attaining the object in view was so obvious as to merit no title to invention. Now that it has succeeded, it may seem very plain to any one, that he could have done it as well. This is often the case with inventions of the greatest merit. It may be laid down as a general rule, though perhaps not an invariable one, that if a new combination and arrangement of known elements produce a new and beneficial result, never attained before, it is evidence of invention."

Much of this language is equally applicable in the case at issue. After the Potts inventions had been made and put into use the machine seemed so simple that it is a wonder some one else had not before invented it. The fact remains that no one did, and that these inventions were created by these inventors, not out of the prior art, not by the combination of a lot of old and well-known devices that had been used for the same purpose within the knowledge of all, but out of their own fertile brains, as the result of their own genius and skill, almost as an entirety; for, as a machine, the machine made was entirely new, and the prior devices alleged to anticipate do not even afford an illustration of any one of the essential elements of these inventions, operating in any other combination to produce a similar result. In this particular the facts in this case are different from most of the cases which this Court has heretofore decided:

"Where the thing patented is an entirety, consisting of a single device or combination of old elements, incapable of division or separate use, the respondent can not escape the charge of infringement by alleging or proving that a part of the entire thing is found in one prior patent or printed publication or machine, and another part in another prior exhibit, and still another part in the third one, and from the three, or any greater number of such exhibits draw the conclusion that the patentee is not the original and first inventor of the patented improvement."

Bates v *Coe*, 98 U. S. 31 (25 L. ed. 68).

"If one inventor precedes all the rest, and strikes out something which includes and underlies all that they produce, he acquires a monopoly, and subjects them to tribute."

Railroad Co. v. *Sayles*, 97 U. S. 554 (24 L. ed. 1053).

"Original and first inventors are entitled to the benefit of their inventions if they reduce the same to practice, and seasonably comply with the requirements of the patent law in procuring letters patent for the protection of their exclusive rights."

* * * * * * * * *

"Actual inventors of a combination of two or more ingredients in a machine, secured by letters patent in due form, are entitled even though the ingredients are old, if the combination produces a new and useful result, to treat every one as an infringer who makes and uses or vends the machine to others to be used without their authority or license."

Seymour v. *Osborne*, 11 Wall. 516 (20 L. ed. 33).

"A patent should be construed in a liberal spirit, to sustain the just claims of the inventor. This principle is not to be carried so far as to exclude what is in it or to interpolate anything which it does not contain. But liberality, rather than strictness, should prevail where the fate of the patent is involved, and the question to be decided is whether the inventor shall hold or lose the fruits of his genius and his labors."

Rubber Co. v. *Goodyear*, 9 Wall. 788 (19 L. ed. 566).

"While it is undoubtedly true that the patentee may so restrict his claim as to cover less than what he intended or may limit it to one particular form of machine, excluding all other forms, though they also embody his invention, yet such an interpretation should not be put upon his claim if it can fairly be construed otherwise, and this for two reasons:

"1. Because the reasonable presumption is, that, having a just right to cover and protect his whole invention, he intended to do so.

"2. Because specifications are to be construed liberally, in accordance with the design of the Constitution and the patent laws of the United States, to promote the progress of the useful arts, and allow inventors to retain to their own use, not anything which is a matter of common right, but what they themselves have created.

Winans v. *Denmead*, 15 How. 330 (14 L. ed. 717).

In view of the facts shown by the evidence in the case to which attention has been called and the law governing the questions involved, as laid down in the decisions of this Court, above cited, we think that our contention that the Court below erred in holding the invention of the patents anticipated by the defense is fully established. We believe it is clear beyond a reasonable doubt, in view of the evidence and the applicable law, that the patents upon which this bill was based were granted for good and valid inventions; inventions that had never before been known or used; inventions which accomplished a result that had never before been accomplished by any machine, and which no prior machine *could* accomplish; inventions which have achieved a great and valuable improvement in the art to which they relate, and contributed a substantial addition to human knowledge on the subject of preparing and manufacturing clay.

THE INFRINGING DEVICE.

The Court below finding no patentable novelty in the machines of the patents had no occasion to pass upon the question of whether or not the machine manufactured by appellees infringes the claims of the patents, as alleged. Should this Court find, as we believe it must, that these patents are for inventions of sufficient merit to sustain patents, the question of infringement must be decided by it as an original question.

Appellees' machine is illustrated in the drawing between pages 26 and 27, Trans. of Rec. (Complainant's Exhibit G), and also on pages 16, 17 and 18 of their trade catalogue, a copy of which is reproduced and printed as the first exhibit in the Supplemental Transcript of Record. Appellees' counsel, in his brief below, contended that there could be no infringement, inasmuch as their shredding roll is constructed differently from the shredding roll of the Potts patents.

Taken as a whole it is substantially correct to say that

appellees' machine is a duplicate of appellant's patented invention. Such differences as exist are in the details of construction. Instead of casting the shredding roll with a solid face, then forming longitudinal grooves therein, and fastening the shredding bars in said grooves, as did the Messrs. Potts, the Creagers cast a central spider or frame of a strong and heavy nature, with radial wings, and cast curved segmental plates with lugs and connections, by which they were adapted to be attached to said spider, and make up a roll with longitudinal cracks or openings in the surface alongside one face of each of the wings or ribs. In these openings the cutting bars were inserted and firmly bolted to the face of said wing or rib. The roll, when its numerous parts are bolted together, is a perfect roll with a solid face, having cutting bars projecting slightly from the slots or grooves thus formed, said bars being adjustably secured therein by means of bolts and elongated bolt holes passing through them. The cylinder is, to all intents and purposes, in so far as operation and result are concerned, an exact duplicate of the Potts shredding roll. This shredding roll is mounted in a suitable frame with a smooth-faced companion feed-roll, which is supported in rigid bearings in close proximity thereto, and furnishes a rigid abutment which supports the clay for the shredding roll to operate upon. The operation is exactly the same as is the operation of the Potts machine, and it accomplishes exactly the same result, by exactly the same means, and in exactly the same way.

It is submitted that mere differences in the construction of the shredding roll can not avoid the charge of infringement. It is remarkable that the ingenuity of these infringers could not have devised greater differences in construction in their attempts to evade the claims of appellant's patent. It is interesting here to note the fact that in their own patents, No. 380,245, of March 27, 1888, and No. 385,342, of July 3, 1888 (which, in their answer to the bill of complaint, they allege contain everything there is of patentable novelty in the art, and under the authority of which they say they manufacture their machines), the feeding roll is shown set at a distance from the shredding roll, and a rigid bar is interposed between them to serve as an abutment. The later patent also contains a set of rolls arranged exactly as in the Potts invention, mounted beneath those which are at a distance from each other. Why did they not MANUFACTURE their machines of such construction? They obtained these

patents, and they publish to the trade that their machines are patented, as will be seen by reference to the extracts from their catalogue, before referred to. Yet the cuts in their catalogue, which represent the machines they manufacture and sell, do not contain these improvements at all, but show the shredding roll set in close proximity to the smooth faced companion roll, in all material respects substantial duplicates of the Potts inventions. We believe that such trivial changes as appear in the details of construction can avail appellees nothing in their attempt to evade the claims of appellant's patents. The very fact that with all their ingenuity, and with all their effort, as shown by the various schemes they had in their minds, which are illustrated in their patents, they could not build a practical successful machine with any more distinguishing features, or features which would better appear to take their construction without the scope of the Potts claims, speaks volumes in behalf of these inventions. The Messrs Potts not only produced the *first* machine capable of performing this very important function and securing to the art the great advantage which it did, but it would seem that they invented the ***only*** machine capable of performing this very important work. Infringers have attempted to evade the patents; have contrived and experimented with various other constructions of machines for doing the work; but have been obliged to abandon them and finally adopt machines so nearly like those manufactured by appellant that one can hardly be distinguished from the other.

Such trivial mechanical differences in details of construction as making up a cylinder or roll from a central spider and frame-work and separately-cast segmental plates bolted thereto, which plates are formed to leave slots in the face of the cylinder, and inserting the shredding bars through said slots, instead of casting the periphery and the central portion in one piece, and grooving the face to receive the bars, are entirely too slight to avail in an attempt to evade infringement. Such differences hardly involve ingenuity. That this Court will countenance such evident attempts to evade a meritorious patent, we do not for a moment believe.

In other similar cases it has not hesitated to characterize such attempts severely, and as we believe they deserve.

"Turning, now, to appellant's shell, or case, * * * * The entire case is such as to admit of its being cast in one piece. * * * * * * * * * * * *

The appellant's case is cast in two parts. * * * *
It is in proof that this is neither reasonable nor necessary. Where the case is large, and too heavy for convenient handling, it may be useful, and for such cases it is suggested in the patent of the appellees. The patent of the appellant prescribes it for all his cases, and he so makes them. Why is this, and what are his object and purpose? We can imagine none but to gather where another had sown, and escape by simulation and subterfuge the consequences which the act of Congress has prescribed for the unlawful appropriation of such property. There is scarcely a thought expressed in the work of the appellees, so to speak, that is not found substantially transferred or closely copied in that of the appellant."

Hyndman v. *Roots*, 97 U. S. 224, (24 L. ed. 975).

In a recent decision in the case of *Hoyt* v. *Horne*, 145 U. S. 302 (36 L. ed. 713), this Court discredited a much more ingenious attempt to evade a patent than these appellees have exhibited. Also in the case of *Sessions* v. *Romadka*, 145 U. S. 29 (36 L. ed. 609), slight differences in construction were not permitted to evade a meritorious patent.

Many other cases might be cited where this Court has refused to recognize purely mechanical differences as sufficient to avoid the claims of a patent for a good invention, but it is not thought necessary to dwell further on this question. The difference is too slight to merit extended consideration.

If it were necessary this appellant would be entitled to invoke the doctrine of equivalents; for, if there is any difference between the construction of the Creager shredding roll and the construction of the Potts shredding roll, one surely is the equivalent of the other. But it would seem to us rather that when completed they are one and the same thing. The only difference at all is in the *method of forming them*. After they are formed they have the same features, the same outward form, operate exactly alike, and accomplish the same result. We believe, therefore, that the charge of infringement is clearly sustained.

AUTHORITIES CITED IN COURT BELOW.

The court below cites a number of authorities in support of the rule that the substitution of one material for another does not involve invention. We have admitted the rule to be indisputable; but believe we have clearly shown that said rule has no application in this case, because these inventors did not

stop with the substitution of one material for another, and, as a matter of fact, the substitution of one material for another was one of the least of the important steps required to produce their inventions.

The court below cites *Aron* v. *Manhattan Ry. Co.*, 132 U. S. 90 (33 L. ed. 272), in support of the rule that "double use" is not invention. His Honor stated the proposition as follows:

"As to the adaptation to a new use of what is to be found in prior patents put in evidence by the defendants, the case of *Aron* v. *Manhattan Ry Co.*, 132 U. S. 90, is strong authority against the complainant."

If the learned Judge intended by this language to hold that the *adaptation* of older devices to new uses *may* not be a patentable invention, in view of that decision, we believe he misstated the rule. The word "adaptation" may mean a great deal.

There is nothing in said decision which holds that the adaption of an old device to a new use may not involve invention, if said adaptation makes changes necessary in the form or structure or arrangement of the old devices, by *which changes* the new use, new result, or new function is made possible. In that case the patent involved was for a mechanical contrivance for opening and closing side gates on the platforms of cars. The evidence showed that gates and doors of nearly every kind and description had previously been opened and closed by mechanical devices of various kinds; that substantially the identical device shown in that patent had been used for opening and closing transoms. As a matter of fact a common transom lifter could have been substituted for the device for opening and closing the gate; or said device could have been used successfully as a transom lifter. The court held that no invention was involved in applying the old and well-known device to the new situation. It was hardly a new use, as it operated in its new situation in no manner different from its operation in the old situation; it accomplished no new result except to open and close a gate which had then but recently become necessary in a particular location, because of the then newly inaugurated system of transportation.

In the case of *Western Electric Co.* v. *LaRue*, 139 U. S. 601 (35 L. ed. 295), the Court in considering the invention, which simply consisted of applying a torsional spring to a telegraph instrument, said:

"So far as the testimony discloses LaRue was the first to

apply the principle of the torsional spring to telegraph instruments, although springs of a similar description had been previously used in clocks, doors, and perhaps some other articles of domestic furniture. * * * Indeed, there is nothing in any of these exhibits which shows the use of a torsional spring in a telegraph instrument, and while the invention does not seem to be one of great importance, we think the adaptation of this somewhat unfamiliar spring to this new use and its consequent simplification of mechanism, justly entitled the patentee to the rights of an inventor."

In the case under consideration the inventors did even more than this: they made changes in a cylinder whereby it was adapted for a new use, and combined with it other features which resulted in the production of a new machine for a new use.

The case of *Butler* v. *Stockel* is another case relied upon by the Court below: The patent involved was for a machine for cutting bretzels. Stamps or dies for cutting pastry in almost every conceivable shape were old and well known. It was common practice to make the die of whatever shape it was desired the product to have. Patterns had been taken from many well-known designs, and the dies or cutters formed accordingly. The bretzel was a well-known article of a well-known design. It being desired to form a die for a machine for cutting bretzels it was only necessary to take one of the well-known articles of the pattern and make it. True, because of the peculiar shape of the article, considerable ingenuity was necessary to form a die so that it would work successfully, but this is all it did require. Nothing new was created except machine-cut bretzels in the place of hand-formed bretzels.

We submit that to apply the same rules which obtain under such conditions as in that railway gate case and that bretzel case, to a case where the conditions are such as are found in this case, where the invention is a machine that was never known before; operates in a new way to perform a work that no machine ever did before; produces a result that is different from any result ever produced before, and marks a great improvement and advance in the art to which it relates, is a gross misapplication of the decisions.

In his opinion the learned Judge also says:

"The claim that novelty and utility are conclusive of invention is, as a general proposition, misleading. They may be persuasive, and in some cases they are well nigh conclusive,

but it must be remembered that without both novelty and utility the question between invention and skill can not arise, and that is the question presented in this case. Every year, with the constant advance of skill in all the useful arts, novelty of construction is and ought to be less and less significant as an indication of invention."

We submit that this reasoning is specious and misleading. "Novelty and utility" are the statutory prerequisites to a patent. The language of the statute (Sec. 4886, R. S.) is "new and useful." Mere *utility* may not be conclusive of invention, although in many cases it has been held to be persuasive of it, but *novelty* **and** *utility combined* are all that are found in any case upon which to base the grant of a patent; and if they are both found in this case, as we believe they are, then we say the Court must hold these patents to be valid, and effectual to protect what we think we have conclusively shown to be a most valuable invention.

In *Seymour v. Osbourne*, 11 Wall. 516 (20 L. ed. 40) this Court said:

"New and useful machines are the proper subjects of an application for a patent, and so, by the express words of the acts of Congress, are new and useful improvements on any machine."

We think, therefore, that it is clear that the Court below misapprehended the true conditions in this case and the rules of law applicable to such conditions, and committed grave error in applying to it the rules which he did.

SUMMING UP.

Clay is the most abundant and widely distributed of all mineral substances. Its manufacture into articles for every day use dates back to the remotest antiquity. The uses to which it has been put have multiplied as the ages, centuries and years have rolled by, until at the present day it enters into the composition of so many articles that are almost necessary to human existence, that the *art of clay-working* must be admitted to be one of the most important, as well as one of the best known, of the manufacturing arts. From the beginning the necessity of reducing the clay to a perfect homogeneous plastic mass before forming into the product, was recognized as of the greatest importance. In early times clay was kneaded by hand, or trodden under the naked feet, until

the required condition was reached. The "weathering" and the "washing" process of disintegrating clay are very ancient. Any imperfections in tempering, such as would result from the presence of undisintegrated lumps, or stones, effected an uneven shrinkage in the product in drying and burning, resulting in its cracking and becoming unfit for use. A perfect disintegration was, therefore, always recognized as a step of the greatest importance in the art.

Brick-making is, also, an art that has come down from the early ages. Brick were used in building the Tower of Babel, and the walls and buildings of ancient Babylon. Brick-making formed the chief occupation of the Israelites during their bondage in Egypt. The same slow, tedious process of getting the clay into fit condition to manufacture, was used in brick-making as in the other branches of the art of clay-working. In more modern times the use of brick has extended to such proportions, the demand has been so great, that inventive genius has been stimulated, and machinery of various kinds invented by which this useful article has been produced many times more rapidly and cheaply than was possible by the old processes. These facts are of common knowledge, as may be ascertained by reference to the articles on "pottery" and "brick" in the Encyclopaedia Britanica.

Upon the advent of brick machines and "pug" mills some machine for reducing the clay to a proper condition for being tempered and mixed by the pug mill, was almost a necessity. The older processes were too slow and impracticable. The "roller crusher" was introduced, and this was used for a long time, but its use resulted in a very large per cent. of imperfect brick and tile, because, as is shown by competent evidence in this case, it simply crushed the clay, leaving it in cakes or sheets for the pug mill to act upon, small portions of which cakes or sheets would pass through the pug mill into the product undisintegrated and untempered, the result being a laminated product which would "scale" and "chip off," or would check, crack or burst by shrinking unevenly in drying and burning.

But brick and tile must be produced rapidly. The modern manufacturer could not go back to the slow and tedious methods. Each machine must turn out its many thousand brick per day. He was, therefore, *compelled* to use the "roller crusher;" he could get nothing better; there was nothing on the market

to take the place of the "roller crusher." So he continued to use it, and crushed the clay, instead of disintegrating it; although the defects were matters of common knowledge and a source of great expense and annoyance. Then the Messrs. Potts brought forth their inventions. Simple though they were, though bearing so close a resemblance in *physical form* to machinery of common knowledge, yet they afforded the art exactly what was wanted. They filled the long felt need. They took the place that had long been waiting for them. They were adopted; they did the work. The inventors obtained patents, which were assigned to this appellant. This appellant entered into the manufacture of the inventions to supply the trade. The machine having been introduced became a necessity. Other manufacturers, including the appellees herein, were obliged to furnish them to their customers. Appellees at first purchased them from appellant. Appellant had difficulty in collecting pay for the machines, and refused to furnish them any more machines. Appellees thereupon began to manufacture them themselves, and obtained patents on alleged improvements. But in their machines illustrated in their trade catalogue, and in the machines manufactured and put upon the market, these alleged improvements are entirely absent. Their machines are substantially duplicates of the machines of this appellant. This appellant then brought suit against appellees for infringement of its patents. Appellees denied infringement, and denied that appellant's patents disclosed any patentable novelty, in view of old devices which they set up. It has been shown that none of these devices show the combinations of the claims of appellant's patents; that none of them are capable of performing the functions or achieving the result of the inventions of appellant's patents; that they could not be made to perform any measure of said functions or achieve in any degree the benefits of said result without material modifications in form, structure and arrangement. These old devices were open to the world; they were common property, and well known. Manufacturers of clay-working machinery were free to use them, if they cared to, for any purpose they saw fit. But they did not use them. They never thought of using them, either before or after the Potts inventions. What they did use was exactly what the Messrs. Potts invented. They added nothing to it; they took nothing from it. These inventions revolutionized the art to

which they relate. Notwithstanding all these facts the Court below dismissed the bill.

We think we have fully sustained our contention that in so doing said Court erred, and we confidently ask, therefore, that this honorable Court will reverse said decree, and extend to this appellant the relief and protection to which it is entitled under the law and evidence in the case.

ERNEST W. BRADFORD,
Solicitor for Appellant.

CHESTER BRADFORD,
Of Counsel.

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Brief for Appellees.

Supreme Court of the United States.

October Term, 1894.
No. 94.

C. & A. POTTS & CO.

Appellant.

vs.

Frank F. Creager, Harry M. Creager, and Jonathan Creager,

Appeal from the Circuit Court of the United States for the Southern District of Ohio.

BRIEF FOR DEFENDANTS.

Wm. Hubbell Fisher,
Counsel for Defendants.

Supreme Court of the United States.

October Term, 1894.
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C. & A. POTTS & CO.

Appellant.

vs.

Frank F. Creager, Harry M. Creager, and Jonathan Creager,

Appeal from the Circuit Court of the United States for the Southern District of Ohio.

BRIEF FOR APPELLEES (DEFENDANTS BELOW).

In the Circuit Court, the complainant alleged that defendants infringed the sixth claim of Potts' patent No. 322,393, and the first and second claims of Potts' patent No. 368,898.

The Circuit Court held with the defendants, and dismissed the bill (see Record, page 127), and accompanied its decision with an opinion (Record, page 122). The complainant appeals to this Court.

The same burden lies upon the complainant as in the Court below, and the additional burden of overcoming the facts as found by the Judge below, and of overcoming the opinion of said Court as to legal points in issue.

The said sixth claim of Potts patent No. 322,393 is

"In a clay disintegrator, the combination, with cylinder A, having a series of longitudinal grooves, of the scraping bars c, and adjustably secured in said grooves, for the purpose specified."

Every separate element in this claim was old when the first Potts' patent No. 322,393, granted in the year 1885, was issued.

We have in this sixth claim the following elements:

1st. A cylinder.

2nd. Longitudinal grooves therein.

3rd. Scraping bars in said grooves.

Whether there should be a fourth element depends upon the interpretation of the expression relating to the scraping bars, to-wit: "adjustably secured in said grooves." The patent says:

"A series of steel bars c, c, are fitted into longitudinal grooves in the periphery of the cylinder, where they are secured by flush screws at each end, or other suitable means, whereby they are adjusted so as to present a sharp corner, d, Fig. 1, projecting above the surface of the cylinder.

The specification is otherwise silent on this subject. It is not clear that the word adjustment here means anything more than the *securing* or *fastening* the scraping bars or knives in the cylinder, for the purpose of presenting a sharp corner, in which event the inventors meant to say, "whereby they are fastened so as to present a sharp corner projecting above the surface of the cylinder."

On the other hand, the complainant insists upon an interpretation of the word adjusted, whereby the knives can be moved out or back, so as to project more or less from the

surface of the cylinder. No means for doing this appear, unless it be understood (outside of what the specification says) that to move the bars (knives) farther out from the surface of the cylinder, or to keep them moved up to their first position as they wear, the flush screws are unscrewed and sheets or blocks, called liners, placed on the bottom of the groove and beneath the knife. Where the specification is so vague, the doubt ought to be resolved against the complainant, and in favor of the public, on the ground that it has no right to have a monopoly of what is not clearly described.

If this latter interpretation be rejected, much of the theory of complainant as presented by its expert, Mr. Bond, falls to the ground.

The defendants, while insisting on the former interpretation, so far as the final decision of this Court is concerned, will yet, for the purposes of considering this claim in the light the complainant views it, allow for the present that the term "adjusted" means that the bars can be moved and set in the grooves at a greater or less distance from the axis of the cylinder, and their edges more or less distant from the circumference of the cylinder.

In regard to the means for rendering these bars thus adjustable, the claim is not specific. It refers to any means, for the claim does not specify the means, and the foregoing specification says, "A series of steel bars c, c, are fitted into longitudinal grooves in the periphery of the cylinder, where they are secured by flush screws at each end, *or other suitable* means, whereby they are adjusted so as to present a sharp corner, d, Fig. 1, projecting above the surface of the cylinder." In other words, any means which will advance the scraping knives edge on will do.

To give this rotary cylinder armed with blades its functional effect, there must be provided something which shall hold the clay or mass to be acted on, against the cylinder, so that the blades can strike or attack the mass. Let us call this the abutment. In the Potts' patent No. 322,393, this was an oscillatory curved plate D. But the complainant does not confine itself to interpreting the sixth claim as a combination in which only abutment of the oscillatory plate form can enter. The claim is in this respect as broad as the earth, viz: co-extensive with the entire range of mechanics, not mentioning the specific abutment D, but including any abutment of whatever shape which may have been already in prior use, or hereafter thought of, to work with their rotary cylinder armed with adjustable blades. One reason for their broad definition is, because the defendant did not use an oscillatory abutment. Another reason may be, that the second Potts' patent (384,278) discredits the peculiarly formed abutment D of this first patent and its operation (see Record, page 25), where the specification of the patent says the plate was rapidly worn (not durable), and from a succeeding paragraph, the public is to infer that the wear was uneven and in spots, that it required an unnecessary expenditure of power, and that it tended to crowd or squeeze the clay.

Defendants will show, among other things, that, long prior to the issue of the Potts' Patent, No. 322,393, that

1st. A cylinder was old.

2nd. A cylinder having longitudinal grooves having bars therein was old.

3rd. Means for securing the bars in position in the grooves, that is to say, means for making the cutting edge

of each bar project more or less beyond the peripheral surface of the bar, were old.

4th. That the combination of these elements in one cylinder was old.

The defenses to this first patent (322,393) are anticipation and want of novelty—non-invention.

Defendant presented eight prior patents.

The first of these is the patent to Butterworth (*Sup. Rec., p. 3,) for his machine for grinding apples, issued thirty years ago, to-wit, 1865. Butterworth shows a cylinder, substantially like the Potts cylinder, armed with cutting knives or blades. These knives are set in longitudinal grooves in the cylinder, and their cutting edges project beyond the peripheral surface of the cylinder. These cutters have means for adjustment, so as to be projected more or less beyond the periphery of the cylinder. The patent says the adjustment is accomplished by "set screws," a term descriptive of their function of setting the knives at the points of adjustment required. In the Potts patent the term "flush screws" is used, a term implying the screws come even with the surface of the thing into which they pass, but not implying anything in the way of adjustment. In the Butterworth patent we have a substantial duplicate of the Potts cylinder A. But to this complainant's expert objects, on the ground that the outer edges of the long blade are notched or serrated in the Butterworth machine, whereas in the Potts machine the knife edge is plain. But does the omission of notches involve invention? Does the neglect to notch or serrate a knife blade involve invention? Is not the plain edge the earlier type, and the

*As used here, the term Rec. refers to Supreme Court Record, and the term Sup. Rec. refers to Stipulation and Addition to Record, Supreme Court.

notched a subsequent one? I answer, Yes. This is proved by the complainant's own patents. Its two patents in suit have cutting knives with plain edges. A later patent to George Potts shows a clay disintegrator having knives with serrated edges, and emphasis is laid upon these serrated edges. (See Sup. Record, page 58.)

Said complainant's expert admits that the Butterworth cylinder would properly work clay, if on the successive knives the notches were not all in common planes intersecting the cylinder at right angles to the axis, so than a blade of the second knife would strike in the notch of the preceding knife.

How does Mr. Bond know that the teeth in successive knives do not dodge one another? Such an arrangement is so common that it is largely a matter of course, and would require no mention by Butterworth. Among the various articles which employ this well-known principle are the common utensils of our kitchen, known as egg-beaters, where rotating teeth dodge each other and alternate with succeeding spaces. Admitting that Butterworth does not show such dodging of the teeth, such lack of mention of a well-known mode in the arts will not prevent his rotary cylinder, armed with knives secured in longitudinal grooves of the cylinder, and provided with stated means for rendering the knives adjustable, from anticipating the Potts cylinder. For it, the Butterworth cylinders fairly and fully answers the description of said Potts cylinder.

The Butterworth machine also presents an oscillatory abutment backed by springs, and provided with adjustments whereby the abutments can be advanced toward the rotary cylinder or retracted therefrom.

Expert Bond claimed for the complainant that the abutments were not stiff enough for clay; but they failed to notice that the abutments could be advanced nearer to the cylinder, thereby rendering the springs more rigid, and consequently making a stiffer abutment.

Next a cylinder or roll C is shown in the Ennis patent (page 5, Supplemental Record), and has longitudinal grooves in which are long blades or knives. (See Fig. 1 and Fig. 5 of the drawing of that patent.) These knives are adjustable in substantially the same manner as the knives of the Potts cylinder, viz., by lifting the blades and inserting sheets or strips at the bottom of the groove and beneath the knife. Thus this roll is a fair duplicate of the Potts roll or cylinder, and will answer to it. The abutment *e*, which holds the mass (paper pulp) against the cylinder, is better organized than the abutment D of Potts' patent, as it has capacity for adjustment nearer to or farther from the surface of the cylinder, and consequently from the edge of the knives thereof.

Turning now to the consideration of the Frost patent (Supplemental Record, page 11), we find a cylinder A of a skeleton or spider kind, but carrying knives, attached to bars *c*, extending across the cylinder longitudinally from end to end, the bars *c* being the equivalent of the back side of the groove of the Potts cylinder. The knives of the Frost patent are secured to these bars, and secured adjustably, so as to be moved out from the axis of the cylinder, as they wear. (For this see Frost's specification and his first claim, which read: "I claim 'The application of the grinding plates a to the cylinder of paper-engines in such a manner that they may be moved outwardly from its circumference, and secured

in position as occasion may require, as hereinbefore explained.' ")

And this, in 1866, some nineteen years before Potts' patent issued; and in 1883 the device covered by said Frost patent belonged to the public, by expiration of the patent, viz., before the Potts patent issued.

Fourth. The VanName patent (Supplemental Record, page 14) for grinding mills exhibits a grinding cylinder B. The patent says: "Four longitudinal grooves, e, f, g, h, are cut slightly dovetailed." Blades of hardened steel are formed and located in these grooves, but are not adjustable therein outward. "There are also blades C^1, C^1, of the same form, made of any softer material, as soft iron, hardened paper, wood, etc., to be placed alternately with the steel blades."

Provision is made for removing these blades for repair and replacement, and for the substitution of new knives, when needed.

A rotary cylinder, armed with knives set in grooves, is a part of the simple mechanism exhibited in the cotton seed huller of Peabody. (Supplemental Record, page 16.) The patent says: "At equal distances apart, around the periphery of the cylinder, are arranged the adjustable knives *c*." "The knives are inserted in cuts or grooves, made so as to give them a suitable inclination forward, and are fitted tightly therein, with a sufficient space left back of the knives for the insertion of wedge-shaped pins for adjusting them, so as to increase or diminish the cutting surface of the cylinder, as may be required; or, if preferable, it may be done by a set screw d, passed through a slot in the knife, the head of the screw being countersunk in the cylinder."

Here is a patent whose devices were the property of the

general public before this suit was brought, as the patent bears date of the year 1869.

The two modes of adjusting the knives farther from the periphery of the cylinder certainly cover and anticipate any adjustable capacity the Potts patent has for adjusting its knives.

By virtue of what right then can the Potts sixth claim be sustained? If sustained, the complainant could properly enjoin the public from using the Peabody cylinder of 1869, and the Frost cylinder of 1866, the Ennis cylinder of 1880, and the Butterworth cylinder of 1865 (thirty years ago).

For it reads:

"In a clay-disintegrator, the combination, with cylinder A, having a series of longitudinal grooves, of the scraping bar c, and adjustably secured in said grooves, for the purpose specified."

And these cylinders just mentioned all answer to this description.

Turning to the Mayfield patent of 1871 (Sup. Rec., page 18) for a grinding mill, we find a cylinder provided with knives set in grooves in the cylinder. These grooves are longitudinal (running as they do with the length or axis of the cylinder). The knives are tangential to the cylinder, and are *adjustable*. Provision for this purpose is made by bolts at the inside of the cylinder engaging the knives or bits, as they are here termed. One-half of these knives have each corrugated edges (as seen in figure 3 of the drawing), and the other half each have smooth edges. As to the relative locations of these two kinds of knives, the patent says (Sup. Record, page 19, top of page):

"Upon the grinding-wheel, each alternate plane-bit has

a corrugated edge, while the others have smooth sharp edges."

Your Honors will here carefully note that the point heretofore insisted upon in the case of the Butterworth patent, that it was a matter of common bench work to make the serrated teeth of one knife dodge the teeth of the preceding one, so that in the revolution of the cylinder, every part of the mass between the abutment and the cylinder should be attacked. Here in this Mayfield patent, every other knife is serrated, and the alternate (succeeding) knife has a smooth edge, which is sure to strike what the projections of the serrated edge miss.

In this cylinder there are shown four smooth edged knives at equal distances apart arranged about the cylinder, and four serrated edged knives arranged in like manner, one between each two smooth edged knives, and these knives are all adjustable out from the cylinder's round (peripheral) surface.

And from this a workman could take his choice. He might take the cylinder and remove the knives having serrated teeth, and leave the four knives having smooth teeth in place. He would then have substantially the Potts cylinder with its adjustable smooth edged knives. He has reached this result by the omission of these rough edged knives.

Is there any invention in any such omission, resolving the cylinder and knives back to the common form generally shown in the Peabody, Frost and Ennis patents?

A man makes a table with four legs. Another man finds a place where a table to be placed in a corner would do better with three legs. Is he an inventor by omitting the fourth leg? Yet he would have to do more arranging than

the man who removed the serrated edged knives from Mayfield's cylinder, because he would have to arrange the three legs and top in a triangular space.

The Smith patent (see Supplemental Record, page 20) for grinding wheat exhibits a rotary hollow cylinder E, slotted longitudinally from its ends to the central flange or spokes, to receive a series of knives F. The knives F rest against inclined lugs, formed upon or attached to the inner surface of the shell E, at the rear sides of its knife slots. "The knives F are slotted transversely to receive the screws or bolts H, that secure the said knives to the lugs, brackets or flanges G, so that the said knives can be moved forward as they become worn."

A concave abutment is opposite this rotary cylinder.

In his patent, Smith lays no claim to the cylinder with adjustable knives in longitudinal grooves, and he no doubt knew such were old at the time of his application. He knew the state of the art, but it would appear the complainant did not.

In the cylinder of Smith, as well as in the cylinder of Mayfield, the knives are tangential, while in the other patents cited the knives are radial. Thus the art in both directions was covered prior to Potts. They took the latter form.

Rudy patent of "75" (Sup. Record, page 22) clay pulverizing, cylinder has longitudinal ribs, see figure 4, sheet 2. The clay rests on concave plate springs, and is then acted on by the cylinder, after which it then falls through a sieve and descends to a second cylinder, and then to a third.

The English Letters Patent to Bombroffe and Baker, dated May 11, 1874, for clay mills, shows a cylindrical roll, for working the clay, to-wit: "pulverizing, grinding or reduc-

ing the clay or other substance." Here the term reducing shows the purpose and function to be quite broad enough to cover any making of the clay finer, including cutting it up or shredding it more finely. The patent says, "and thereby produce a finer clay" (see Sup. Record, next to last paragraph, page 24).

This is substantially what the Potts wish to do, see their second patent, Record, page 25, next to last paragraph. The English cylinder shows ribs (bars) projecting from the surface of the cylinder, and taking a "spiral, screw or Archimedian course."

The patentees further say that "one or more of these rollers may be employed in a mill, and although specially applicable to pulverizing clay, they may be advantageously employed for the reduction of other substances."

Attention is called to the fact that these men perceived that a mill of this order can be used in the reduction of articles other than clay.

And *vice versa*, among other reasons, defendants feel fully justified in citing to the Court disintegrating, grinding and reducing mills, whose primary object of whose construction was for the reduction of substances other than clay.

Other further examples of the use prior to Potts of a cylinder substantially such as he uses, as regards longitudinal knives on the surface of a rotating cylinder will be mentioned in connection with those claims of the second Potts patent in suit.

NON-INFRINGEMENT.

On the subject of non-infringement, James Moore, Esq., attorney for defendants, in the court below, presented the following:

"The defense to the first patent is anticipation of the invention. The defense to the second is, strictly speaking, absence of invention; but anticipation of the invention of the second patent is also fully shown by the exhibits relied upon to show want of invention.

"NON-INFRINGEMENT OF THE SIXTH CLAIM OF PATENT 322,393.

"An issue upon the question of infringement has not been presented in the respondents' testimony, but infringement has been denied in the answer, and it is clear to a demonstration that, so far as the first patent is concerned, there is no infringement; and in reference to the second patent, it is also reasonably clear, as I shall point out briefly.

"The claim in this first patent distinctly calls for 'a series of longitudinal grooves' in the cylinder.

"Now, the defendant's machine has not grooves for the insertion of its knives. Their cylinder is a skeleton or 'spider,' the knives being respectively fastened to the several arms projecting from the hub, one knife to each arm, and the periphery formed by filling in metal plates between the knives.

"And in this way cylinders carrying cutters, blades, bars, breakers or scrapers, as they were indifferently called, were commonly formed long anterior to complainant's alleged invention, of which there are several illustrations in defendants' exhibits, as pointed out in the testimony of Mr. See.

"The Frost and VanName patents may be referred to here as having their cylinders built up in this way.

"That complainant's expert, Bond, felt the force of this is evidenced by his testimony, where he distinguishes between complainant's invention and some of the defendants' inventions and some of the defendants' exhibits offered to anticipate it. *Vide* his treatment of the Butterworth patent, Record, page 93; Ennis patent, page 95,

par. '9;' Peabody patent, page 97, par. 13. And see his answers 6 and 7, page 14, where he defines the Potts inventions of both patents. In this sixth answer he is forced, by the obvious difference in this respect between complainant's invention and defendants' construction, to attempt their reconciliation, and his effort is, or involves, a palpable misrepresentation of defendants' construction. He says: '* * It is true that the grooves of the cylinder in the patent do not extend through the cylinder, while in the drawing, Exhibit "G," such grooves extend through the cylinder.' Now, if your Honors will but refer to the vertical section on drawing, Exhibit 'G,' defendants' machine, it will be apparent that there is nothing in it justifying the use of the word 'groove?'"

Pursuing this argument of Mr. Moore, it may be remarked that while the solid cylinders with adjustable longitudinal knives anticipate the Potts cylinder, yet as to the spider or open cylinders with adjustable longitudinal knives, the complainant is forced into this dilemma. If it holds that these prior open cylinders do not anticipate its sixth claim, then it can not claim that the defendants' open cylinder infringes.

On the other hand, as it, in fact, claims, that the defendants' cylinder, etc., does infringe, therefore (attempts to make the claim cover such a cylinder) the question arises: Is it attempting to run down the defendants—to illegally bring prior devices belonging to the public under tribute to the Potts recent claim?

In connection with the question of these open or spider-framed cylinders, see later remarks on the subject of their being practically operative.

CONSIDERATION OF FIRST AND SECOND CLAIMS OF POTTS PATENT NO. 368,898.

The complainant alleges that the defendants infringe the first and second claims of the second Potts patent No. 368,898.

Claim 1 reads:

"In the supporting frame of a clay-disintegrator, a rotating cylinder longitudinally grooved and carrying cutting bars in and projecting beyond the grooves in combination with a smooth-faced rotating cylinder adapted to carry and hold the clay against the cylinder having the cutting bars thereon, which latter cut or shred the clay and pass the same between the cylinders, substantially as set forth."

Claim 2 reads:

"In clay-disintegrators, the combination with the main supporting frame and with a rotating cylinder fixed therein, and having longitudinal cutting bars projecting beyond the face thereof, of a positively revolving companion cylinder fixed opposite thereto in said frame, and having a smooth face or surface, with which said cutting bars directly co-operate to shred or clip the clay as the same is fed by and passed between said cylinders, substantially as described."

CLAIMS 1 AND 2.

The first claim consists of five features combined, to-wit:

1. A supporting frame.
2. A rotating cylinder.
3. Grooves in cylinder.
4. Cutting bars in the grooves and projecting beyond.
5. An abutment, in this case a rotating roll or cylinder.

The rest of the claim is devoted to what the combination

does in working clay, and closes with the words "substantially as set forth."

If the combination had been devoted to the working of some other thing or mass, it would no doubt have in that case specified that the combination worked the mass in such a manner.

Claim 2 claims a combination of five elements, viz:

1. A supporting frame.
2. Rotating cylinder.
3. Cutting bars projecting beyond the face thereof.
4. A smooth faced cylinder, opposite the cylinder with cutting bars.
5. This cylinder positively rotates.

How is the clay fed between the rollers? The first claim says the cutting bars of the cylinder feed the clay between the cylinders. I quote, "which latter cut or shred the clay and pass the same between the cylinders." The claim is silent as to whether the smooth faced cylinder D is or is not positively driven, while in the second claim the positive rotation of the smooth cylinder is made a positive element.

The first claim evidently was drawn to cover any device that had a grooved cylinder with projecting cutting bars, opposite to a smooth faced cylinder whether the latter was positively rotated or was an idler, and in the latter case rotated by the mass fed through by the cutting bars of the main cylinder, when it worked clay, and this no matter whether such device had previously existed in any other departments of the arts. When clay was fed to it, it was to be brought under tribute to this claim.

In the second claim, all claim for the grooves, in the combination, is omitted, and any cutting cylinder having

longitudinal bars in combination with a positively revolving smooth faced cylinder is supposed to be brought under tribute, in the sphere of working clay.

The clay is no doubt here fed through by the cutting bars, although the phrase is changed to "as the same (the clay) is fed by and passed between said cylinders." Certainly the cutting bars must feed in whole or in part, as they pass the mass along as they grind, cut or shred it. The claim closes with the words "substantially as described." Referring back to the specification, we find the relative sizes of the cylinders (rolls) may be varied. I quote, "it will be understood that the diameter of the feed-cylinder B may be larger or smaller than that of the cutting cylinder C, or, again, that both cylinders may be made of the same diameter." The preference is (per specification) to have the smooth faced cylinder B larger than the cutting cylinder C, but the drawing, figures 2 and 3, show to the contrary, viz: the cutting cylinder C to be the larger.

It was therefore the intent of these two claims (1 and 2) to cover, without regard to the relative sizes of the cylinders, any combination wherein two cylinders were employed, one a cutting cylinder having longitudinal cutting bars, and an opposing abutment, viz: a smooth faced cylinder with the following qualifications, to-wit: that in claim 1, the cutting bars should set in grooves, and that in claim 2, the smooth faced cylinder (roll) should be rotated positively.

No prescriptions are stated as to the precise rates of speed, except that preference is stated that the cutter cylinder rotate the faster. The rates of speed are left to the judgment of the operator. In other words, speed your cylin-

ders to suit the case, in the present case, the quality and nature of the clay.

That clays differ in moisture and stickiness is clear from specifications of the first and second patents.

Having thus briefly analyzed these claims, let us proceed to view them in the light of the state of the prior art as to rolls and cylinder.

We have shown that cylinders having longitudinal grooves and cutting bars, blades or knives therein were old long prior to the Potts application for their first patent No. 322,393, as in the case of Butterworth.

In four of these the cutting-bars were adjustable in the grooves, so that their edges could be moved out from the surface of the cylinder; but, as the greater includes the less, they, of course, are cylinders having longitudinal grooves, containing cutter-bars therein. Such a grooved cylinder with cutting-bars was, therefore, not only old as regards Potts' second patent, by being shown in the first Potts patent, but also long prior thereto in many instances, as cited. Of course, a single smooth-faced roll or cylinder was old. Where it was desired to make a roll do a given work, and be assisted by an opposing co-operating abutment that would contribute to the feeding of the mass to be worked between the cylinders, nothing was, and still is, more common than such an arrangement. The common house clothes-wringers, that have been on sale and in use, as your Honors well know, for over twenty years, employ a rotary cylinder (roll) as an abutment opposite another rotary cylinder. Furthermore, both rolls in rolling mills are positively driven, as you will recall, by interlocking toothed wheels, turning both rolls or cylinders. The common fluting rolls, well known to the

ladies, consist of two rolls whose longitudinal teeth interlock to flute or corrugate the lace or other fabric passed between them as they are rotated. In rolling rail or iron bar, and the like, there are two opposing rolls, of varying diameter, according to the work to be done, and in many instances both rolls are positively rotated, the one roll being an abutment for the other. Thus we see (I think your Honors will agree) at the outset of this line of investigation, that it was a household suggestion before the Potts patents to employ a roll positively rotated as an abutment for another roll. And such being the case, the question naturally arises: The main or cutting roller C, with its longitudinal grooves and projecting cutting-bars therein, as an entirety, being old prior to the Potts patents, and a positively driven rotary roll being a well-known device in use as an abutment of another roll, is there any patentable novelty in the Potts substituting a smooth-faced roll in place of the curved oscillatory abutment of the first patent, as soon as they found that the oscillatory abutment did not accomplish what they thought it would, or, at least, what they desired? Is not such a substitution bench-work—a substitution naturally thought of occurring to any first-class mechanic skilled in the art of rolls and co-operative cylinders, not to speak of men less informed? Does it not fall below the high grade of conception necessary to a patentable novelty—for a novelty to be patentable and to exclude others (the public) from the privilege of also, at any time, putting the same into effect?

With your permission, very pertinent examples of a few of the prior combinations of cylinders in the useful arts, including some used in the manufacture or reduction of clay, will now be given.

The grinding mill of A. Voelk, of 1880, (Sup. Record, page 27) is, I quote, "for grinding grain, corn and cob feed, or bones, plaster, etc.," a wide range of objects, but illustrative of the possible use of such mill for many different classes of materials. Voelk uses two cylinders (he calls them burrs), each made up of discs in juxtaposition and provided with teeth. Each cylinder is positively driven, see figure 2 of drawing and the following from the specification. "C' and D' are spur-gears on their respective shafts c and d, of which C' is the minor, and D' the major, gear, so that the burr D will move much slower than the burr C."

Here are two cylinders, the one an abutment for the other, the main cylinder C going four or five times faster than the minor cylinder D.

What invention would there be in omitting the teeth on cylinder D, thus reducing the cylinder to a smooth-faced roll already common in the arts and long in use as an abutment to another roll? Thus changed by omission of its teeth, we have here the combination of a smooth faced roll (cylinder) in combination with a cylinder armed with teeth, and the omission of the teeth of one cylinder would necessarily bring all of the teeth of the main cylinder into one peripheral surface.

Voelk admits (Sup. Record, page 29, third paragraph) that two opposing revolving burrs were old as far back as 1845.

"In view of the fact that the Potts patent in suit comprehends the making of the cutters in short sections; and in view of the fact that it also comprehends the forming of the cutters integrally with the roll, this Voelk patent fully responds to the claims in suit, inasmuch as it presents a cutting cylinder operating in conjunction with an oppositely-set,

positively-driven lower-speeded companion cylinder, forming an abutment and aid in the feeding." (See's testimony, Record, page 48.)

Gale, in his patent of 1867 for straw cutter, sets forth a smooth faced cylinder of hide, opposed to a revolving cylinder carrying long bladed knives projecting therefrom. The knives rest in grooves in the open or frame cylinder. It is true that his knives follow a somewhat spiral course over the cylinder. But this does not prevent the combination of a cylinder armed with knives, located in grooves therein and projecting therefrom, opposed to a cutting roll smooth faced, both rolls being positively driven. Such combination meets the combination of the first and second claims, unless you hold that the word "longitudinally" before "grooved" in claim one and "longitudinal" before "bar" in claim two must be confined to a bar absolutely straight and in line with the axis and this construction, I believe, you cannot consent to do, in view of what the Potts' second patent states, to-wit: "Instead of having the bars replaceable, they may be cast in piece with the cylinder C, although such form is not to be preferred, because on wear or breakage of the projection d, the entire cylinder must be dispensed with. Instead of having the cutter-bars straight and mounted in longitudinal channels across the entire length of the cylinder C, such bars may be short and set in *staggered* or *zigzag* fashion across the face of the cylinder. Whatever kind of cutter-bar d be adopted, the purpose is to arrange such bars so as to project slightly from the face of the revolving cylinder C, and barely clear the face of the opposite cylinder B."

The remarks of Mr. See, expert, on the well known use of spiral blades, as the equivalent of straight blades and *vice*

versa, are in point not only as to the exhibit English patent of 1874, (Sup. Record, page 24), but also in relation to this roller mill of Gale. See (Record, page 43) says: "The knives are arranged with a slight spiral, as is quite common. The two cylinders revolve toward each other at equal speed, while in the Potts' patent the gearing is illustrated as so arranged as to drive the non-cutting cylinder at the greater speed. Potts' specification, however, states "that the cutting cylinder may be caused to revolve more rapidly than the companion cylinder D."

A revolving cylinder carrying blades set in grooves, and projecting beyond the cylinder, in combination with a smooth cylinder C opposed as an abutment, is shown in the Whittemore straw and stalk cutting machine of 1861.

In the patent to Blackie (Sup. Rec., page 36,) for machine for pressing tobacco, issued away back in 1866, and now public property for eleven years, the title is misleading. The devices are not only for pressing tobacco, but for cutting it. The device for cutting the tobacco is shown at the right hand end portion of Fig. 2 of drawing, and consists of a cutting cylinder E, having knives N running in a curve the length of the cylinder, and an opposing abutment in the shape of a smooth-faced cylinder, both rolls being positively driven by gear (toothed wheels), for which see Figs. 1 and 2.

Fletcher, in his patent for pulp engine or crusher, of 1871, now public property, in referring to his machine (Sup. Rec., page 42), says: "In the drawing, A, B represent the crushing cylinders, which are located one above the other, and composed of sections B^1, shown in Fig. 1." And in paragraph next to last, on this page 42, he says: "Fig. 3 shows an equivalent construction, in which H represents a

cylinder provided with depressions I on its periphery, and revolving over a plain cylinder J, the cylinder H being constructed in sections, arranged like those of cylinder J."

Any one or more of the sections of cylinder H will answer to the description, and fulfill the requirements of a cylinder having longitudinal cutting-bars opposed to a smooth abutment in combination.

The relative speed of revolution and the rate of revolution of each roll are left to the choice of the user, as he finds desirable.

In view of the fact that the positive revolution of each of two rolls in relation to the other was old before the Potts patent, and the fact that cylinders in such combinations, and provided with grooves, carrying knives projecting beyond the cylinder, were also known long before the Potts patent; and in view of the fact that the Potts patent itself, in its specification, does not limit the construction of its main cylinder to one where the knives are set in grooves (for it says the knives may be cast integral with the cylinder), it is respectfully submitted that there is no patentable invention shown in the combinations, in either of the first or second claims of the said Potts' second patent.

In the patent to Alexander, 125,159 of 1872, we see a mill for the reduction of clay, etc., in which one reduction is accomplished by two rolls or cylinder, D, D^1, both provided with blades, constituting what may be termed one mill. The machine illustrates that fact that the reduction of clay can be accomplished not only by cylinders armed with blades, but also by smooth cylinders, for the patentee uses a pair of smooth cylinders F, F^1, in his second reduction.

Examine Fig. 1 of the drawing, sheet 1, of the Case

patent of 1884, in connection with his specification, and you will observe that he shows two rolls, one smooth and the other a cutting roll. He terms the smooth cylinder the stationary one, not because it does not rotate, but because it rotates in fixed bearings, in contradistinction to the bearings of the other roll, which latter bearings are adjustable for enabling the moving (cutting) roll to be moved nearer to or farther from the smooth roll, according to the necessities of the work to be performed. (See his specification, lower part of page 49, Sup. Rec., and following page.)

That the rolls are positively driven, and are run at different rates of speed, see See's deposition, Rec., pages 46, 47, marg. page 80, 81.

In view of his own knowledge of the art, he finds that the "Case patent responds to the claims in suit, inasmuch as it presents the rotary cutting cylinder operating in conjunction with an oppositely-set, positively-driven smooth-faced companion cylinder, adapted to carry and hold the material against the cutting cylinder while the cutting cylinder operates on the material, and passes it between the cylinders."

Mr. See (Record 48) remarks:

"Potts patent, 322,393, of 1885, the earlier patent in suit in this cause, shows a reducing mill in which the cutting cylinder operates against a cylindrical abutting surface which is non-rotary. But the state of the art has long recognized the advantages incident to giving such abutting surface the character of a complete cylinder in continuous rotation, so as to aid in the feeding as well as to furnish a mere non-cutting abutment. The state of the art therefore fully comprehends the substitution of such complete cylinder continuously rotating as a substitute for the non-rotating partial cylinder found in the earlier Potts patent. Thus viewed,

and thus modified in structure, without the exercise of anything in the way of invention, this earlier Potts patent would clearly respond to the claims of the later Potts patent in suit."

Referring to the English patent of 1874 (Sup. Record, page 24), Mr. See (Rec. 43) remarks:

"Thus viewing the claims as comprehending longitudinal knives, whether exactly straight along the cylinder or spiral, as is equally common in reducing rolls, this English patent would appear to respond to the claim, for the reason that it certainly indicates, first, an older roller mill with smooth cylinders; second, a reducing roll, provided with longitudinal cutters, and third, the employment of 'one or more of these rollers' in a roller mill. This English patent fully comprehends two companion rolls operating together to reduce clay or other substances, and it fully comprehends the provision of either one or more of said rolls with longitudinal cutters secured to the cylinder by screws or 'equivalent means.'"

All of Mr. See's deposition upon this patent is of great interest, and your Honors are respectfully requested to carefully read it.

The Wells patent of 1866 (Sup. Rec., page 44) is remarkably in point. Peat is a description of mould and earth, allied to clay in consistency, but more difficult to reduce than clay. I submit that a machine which will reduce peat will easily reduce clay. The specification (Sup. Rec., page 45, last paragraph,) says: "The peat becomes broken up into a common mass," etc., so that it will easily glide down the bottom of the box towards the cylinders H, H^1. These cylinders may be of metal or any suitable material." See more particularly Fig. 2 of drawing. "The cylinders H, H^1 are geared together, in this instance, by gears of equal diam-

eter, but the cylinders themselves are of unequal diameters, the lower cylinder, H^1, being the largest, from which it follows that, since both cylinders make their revolution in the same period of time, the surface of the lower cylinder, H^1, will rub against and slip on that of the upper." The object is stated lower down, on page 46, to-wit: "When the peat falls against the cylinders, after it has passed the toothed shaft G, it is drawn between them, as between feed-rolls, the lower cylinder rubbing the peat against the upper cylinder with a tearing and grinding action, for the reason that its surface moves with greater speed than that of the other, and at the same time crushing the peat, so that when it emerges from between them its fibers—that is to say, the undecomposed matter which is interlaced throughout the peat—is crushed, and also torn to pieces."

Later, on page 47, paragraph 3, he says: "Instead of using rubbing-cylinders of unequal diameters, cylinders of the same diameter may be employed, by running them at different speeds."

And in paragraph 5: "The action of the cylinders, H, H^1, on the peat is not like the action of ordinary pressure-rollers, but they, while feeding the peat forward in the machine, tear it apart, owing to the difference in the speed at which their peripheries move, at the same time reducing it very fine and excluding the water released from its cells, so that the peat is delivered to the molders in a condensed state."

The names given to the reducing or cutting cylinder vary. Thus in the Voelk patent cited, it is called a burr.

In the Alsip & Drake patent of 1885 (Sup. Rec., page 52) the cutting roller is called "a muller." I quote (page

53): "Said muller H is grooved in the manner shown, to form teeth or sharp-pointed corrugations h^3, which serve, by the weight of said muller, to cut or crush the lumps of clay as the same are fed into the hopper J, preparatory to passing between the rollers C, D."

Bear in mind that the cutting cylinder (muller) H (Fig. 2 of drawing) turns from left up over toward the right to the hopper slide J. The latter inclines, and down toward the first smooth roll C. The sides of hopper are removed, to show the parts of which we speak. The clay fed forward is carried by the cutting cylinder H over and down against hopper J. The clay then crowds between the cutting cylinder and the smooth roll or cylinder C beneath. The rotating cutting cylinder H reduces the clay, using the smooth rotating cylinder as an abutment. Both the cutting cylinder and the smooth roll are positively driven, the former being rotated by a pulley belt and the latter by a gear (toothed wheel). The cutting blades are long straight ones, running the length of the cylinder. This muller has its cutters formed in one with the cylinder, as contemplated in the second Potts patent in suit.

This Alsip & Drake patent responds in terms to the second claim of the Potts patent in suit, because it, the Alsip & Drake patent, presents a cutting cylinder operating in conjunction with a smooth-faced companion roll positively driven, whereby the clay is fed and passed between the cylinders.

Inasmuch as the setting of the cutting-bars in grooves in the cylinder was a mere mechanical expedient, well-known long prior to the Potts patent, and open to the public to adopt, it would be no invention to make this change in the

Alsip & Drake patent, and then the Alsip & Drake mill, wherein—the blades being set in grooves in the cutting cylinder or muller—the combination of a cylinder with longitudinal grooves having cutting blades therein operating in conjunction with an oppositely-set, positively-driven smooth-faced companion roll, whereby the clay, as cut, is fed by and passed between said cylinders, would meet the first claim in terms. As the Alsip & Drake machine stands, it deprives the first claim of the Potts patent of any patentable invention.

The patent to Creager of 1878 (Sup. Rec., page 56,) describes a smooth small cylinder D, opposed to a large cylinder B. In the cut this latter is shown as smooth, but the specification provides (paragraph bottom of page 56) that, if of metal, "it may be provided with corrugations." In the latter event, the straight ribs of the corrugations are suggestive of the bars of the Potts cylinder.

In the Creager machine, illustrated by model and supported by testimony of Stallo, Evans and Creager (Record, pages 54–57), we find a cylinder or roller carrying on its periphery a series of projecting strips of glass. These strips of glass are fitted into longitudinal grooves in the peripheral portion of the cylinder. Their projecting edges, though somewhat rounded, can be easily squared off. It would require no invention to do this, when a cutting edge was required.

Opposed to this cylinder, the Creager machine shows a smooth roll acting as an abutment. True, the grooved cylinder carrying the projecting strips is above the smooth faced companion roll, but it involves no invention to turn such a combination into a horizontal position. It will be remem-

bered that the Alsip and Drake patent for working clay shows the rolls in the vertical position, the cutting cylinder above smooth faced companion roll. Therefore the Creager machine responds to the claim for a cylinder with projecting bars set in longitudinal grooves in the cylinder, operating in conjunction with a smooth companion roll, answers to the terms of the first claim of the Potts patent, and inasmuch as the positively driving of the smooth faced companion roll was a well-known mechanical expedient to be used when desired (shown in patent to Alsip and Drake, *supra*), this machine deprives the Potts second claim of all patentable invention.

In regard to Exhibit No. 1, Extract from Knight's Mechanical Dictionary, published in 1876, and Exhibit No. 2, Extract from Knight's New Mechanical Dictionary, published in 1882, proved (Record, pp. 37 and 38), Knight's Exhibit No. 1 (set forth in Record, p. 120) shows a cutting cylinder having projecting spiral scraping bars above and a smooth faced companion cylinder below, both cylinders, positively driven, the cutting cylinder revolving much faster than the smooth one. See description at foot of figure.

Similar mechanism in Knight's Exhibit No. 2, (drawing follows drawing of Knight's Exhibit No. 1), is for rasping roots. The upper cylinder has long blades, opposing companion cylinder fluted. The fluted cylinder makes one turn for every twenty-five revolutions of cutter. The first of these machines answers claim 2 of Potts' patent in exact terms, and for the reasons heretofore mentioned demonstrate the lack of novelty in Potts' first claim.

Thus has been presented to your Honors a large number of effective machines, some of which directly anticipate the

claims in controversy, and others of which present such close similitude as to render the step from them to the Potts' structures only a mere mechanical expedient—mere bench work, of a kind well-known and long the property of the public—mere obvious changes less than even mechanical equivalents.

Permit a few brief remarks as to the testimony, etc. The complainant's expert is not an expert (practically) as to these matters in suit. He says (Record, page 112): "I have never operated a clay disintegrator, but I have seen one in use of the Potts construction." He does not aver he has had any practical acquaintance with grinding mills.

The defendants' expert, See, has had much practical experience in connection with the designing and construction of grinding mills of the roller and other types. (See Record, pages 31, 34 and 42.)

The opinion of the defendants' expert, See, is, therefore, entitled to great weight in the matter of the state of the art and upon the doctrine of equivalents and of mechanical expedients.

On the other hand, the opinion of the expert, Bond, that this and that exhibit would not work in clay, together with other strictures allowed without question only to one practically acquainted with an art and its cognate art, should be rejected.

Complainant makes objection to the Alsip and Drake machine and to several of the other grinding mills on the ground that these mills would not reduce the clay in the same manner that the Potts machine would, because the clay would stick between the longitudinal blades or teeth of the cutting roller,—in other words that the machine would ball up and clog.

The answer of T. E. Chandler, witness for complainant (Record, p. 77, cross-question 47), exhibits the weakness of the ground upon which the complainant stands in this particular.

This question and answer read as follows:

X-Q. 47. "Suppose the Alsip & Drake muller had its blades four inches apart, and make the same supposition with reference to the cutting cylinder of the model of Fig. 262 of Knight's Dictionary, and state, if you please, whether they would then be practical in the operation of disintegrating clay, assuming the cylinders of a full-sized machine to be each twenty inches in diameter?"

A. "The effect in the Alsip & Drake machine would not be very different from what it is as shown by the model, because the clay passes between rollers, no matter what construction the upper or feeding cylinder may be, consequently the clay is not left in the condition that the Potts machine leaves it. Your question assumes that the rollers of the machine shown in page 89 of Knight's Dictionary shall be of equal diameter, one of them a smooth roller, and the other a bladed roller with blades four inches apart, with those rollers placed in proper relative position to each other, and with proper relative speed *the effect upon the clay would be the same as in the Potts machine*, if the knives in the periphery of the roller did not clog and retain the clay."

From this answer it would appear that if the blades of the cutting roller were placed four inches apart, and the smooth faced cutting rollers placed in proper relative positions to each other, and with proper relative speed the effect would be the same as in the Potts patent, if the knives in the periphery of the roller did not clog and retain the clay.

This, among other answers, goes to show that the points of patentable difference in the minds of the complainant

between Alsip & Drake machine and the model of Fig. 262 of Knight's Dictionary on the one hand, and the Potts machine on the other, depend substantially upon the three following items:

1st. The distance between the blades on the periphery of the cutting roller.

2nd. The relative position of the two cylinders.

3rd. The relative speed.

As to these three points, we submit that they do not constitute patentable difference, but are questions of simple mechanical adjustment upon trial of the machine.

Surely there is no invention in placing the cutting blades farther apart on the Alsip & Drake machine, in view of the patents to Peabody, Mayfield, Smith and Whittemore, where the cutting blades are widely separated on the periphery of the cutting roller.

In view of the fact that certain of the anticipating exhibits cited not only contemplate, but show and describe positive means for intentionally changing the distance of the cutting cylinder from the opposing abutments or roll, according to the service for which they are intended, and the necessities of the work required, there is no patentable invention involved in Potts locating their cutting cylinder, so that its knives "barely clear the face of the opposite cylinder B." (See Potts second patent).

As to the tests whereby the expert, Mr. Bond, attempts to distinguish the complainant's inventions from certain of the defendants' exhibits, we give the following: One of Mr. Bond's favorite distinctions is that the complainant's knives strike a quick sharp blow—assuming that the cutting knives

belonging to the exhibits cited on behalf of the defendants do not.

In reply to this, I ask where, in the complainant's patents, do you find any such statement made, or hinted at, as that the knives strike a quick, sharp blow? His testimony (Record, page 95, paragraph 9; page 101, paragraph 24; page 103, paragraphs 30 and 32, and page 104, paragraph 34, and at other places in his depositions,) illustrates the use he makes of this, his self-selected test. Evidently here he is trying to argue that the mechanism described in the claims of the Potts patents is somehow different from the mechanism of the anticipating devices cited by the defendants, upon an assumption that the functions performed by the Potts mechanism are different from those performed by the defendants' exhibits. In fact, this is simply an assumption. In these anticipating devices which the defendants cite, wherein the knives are closer together upon the cylinder than are the knives of the Potts patents, the more closely assembled knives will strike quicker blows, that is to say, a quicker series of blows than the cutting cylinder of the Potts patents, providing they have the same speed.

In the case, where the knives on the cylinder are farther apart, as in some of the aforementioned patents cited by defendants, the knives will strike a quick, sharp blow, provided the cylinder revolves at a rapid rate, and in rotating rapidly and striking a quick, sharp blow in conjunction with the opposing smooth-faced cylinder, as is shown in some of the defendants' exhibits cited, the operation of the machine would be substantially the same as regards the quick, sharp blow as that of the mechanism included in the claims of the Potts patents.

The specifications of the Potts patent are silent as to the speed requisite for the cylinders to attain in properly working the substance fed to them. I say "substance;" and right here I desire to call the attention of the court to the fact that the patent in suit, No. 322,393, states that "It is desirable at times, in disintegrating dry or nearly dry clay or other like substance, to feed the mass to the cylinder without great pressure." Manifestly this means a substance other than clay, otherwise the expression would not have been used. What it no doubt does mean is any substance that could be worked by the combination set forth in the patent, whether it be clay or peat, etc.

A superficial perusal of the testimony for the complainant, including that of the expert, Mr. Bond, will discover that their theory of attack upon the exhibits of the defendants is to interpret the mechanism through the functions which they are to perform, and, after having done so, to interpret the functions through the object or particular thing fed to the machine and operated upon by it. The argument lies in this way:

The function of a given anticipatory Exhibit "X," is different from the function of the Potts machine, because Exhibit "X" works upon apples, while the Potts machine works upon clay, and as clay and apples are not alike, therefore the machines must be dissimilar. The fallacy of such assumption and argument is evident.

We reply that where machines are similar in the principle of construction, the mere fact that one machine is lighter than another in weight and general conformation, does not prevent such machine from preventing a valid patent being had upon a machine heavier in weight and conformation, be-

cause there is no patentable invention in thickening knives or in increasing the diameters of cylinders or in strengthening the frames, when the machine is to work upon a heavier or different material.

Enlargement is not patentable. (See *Philips* vs. *Page*, 24 How., 164, also *The Planing Machine Co.* vs. *Keith*, 101 U. S., 479.) in relation to a planing machine, where the Court held, "A machine remains the same in principle, although one or all of its constituents be enlarged and strengthened so as to perform heavier work."

One of expert Bond's tests was that certain of the alleged machines did not anticipate, because their cutting cylinders contained openings in front of the knives they carried, and he included in these patents the Peabody patent and the Mayfield patent.

These openings are called by different names in the different patents, such as slots, grooves, concavities. His reason for this opinion is that such openings in the periphery of the cylinder would destructively interfere with the operation of the cylinder in working the clay.

By making such a test, he unwittingly fell into a pit-fall, to-wit: the defendants' machine for working clay, which the complainant insists infringes the Potts patents, has slots or openings in front of the knives. Such slots would prevent a prior machine from anticipating, but would not prevent a subsequent machine from infringing.

(See upper figure of complainant's exhibit F of defendants' machine, page 1, Supplemental Record, also complainant's exhibit G, Record, page 26).

And yet he says, X.-Q. 17, Rec. 115, "Recesses on a cylinder of the Potts construction, with cutting bars operat-

ing like those in Potts patent, would be a cutting cylinder similar to the Potts."

Will this Court allow a patentee to deny anticipation on a given ground, and to ignore that ground, when seeking to bring another's machine under tribute to his patent?

The complainant objected to the defendants' interpretation of the sixth claim of the Potts patent, on the ground that the defendants' interpretation is too broad. Let us see how complainant defends said claim 6:

"The language of the sixth claim indicates clearly that it is a combination claim, and is not capable of the assumption that it was the intention of the inventors to claim broadly the cylinder A, with longitudinal grooves and adjustable cutting bars, if such cylinder was merely placed on a floor or bed without any action, as it would not then serve the purpose specified, which is clearly defined in the specification; in other words, I do not understand that by this sixth claim the inventors seek to cover broadly the cutting cylinder, *per se*, but do claim such cylinder as part of the combination in a clay disintegrator."

Observe the last part of the definition, namely, "in a clay disintegrator," as if using the combination in a clay disintegrator would take it out of the pale of well-known machines, and enable the patentees to patent it for this special purpose and exclude the public from working clay in any similar machines, because it had not happened to have been used in working clay.

One great point urged by the complainant's expert was that the anticipations cited by the defendants would not work soft, sticky clay, because it required a machine just like the complainant's to do this, and the secret of that machine was that the cutting cylinder of it struck a quick, sharp blow,

and that the machine would not clog. Every mill man knows, and I believe that most of your Honors are aware of the fact, that the question of whether a rotary cutter shall clog or not will depend upon the speed imparted to it. Thus a circular saw turning 100 revolutions a minute would readily clog, while the same saw turning at the rate of 1,000 revolutions a minute, abundantly clears itself, and performs its work thoroughly and well; and in relation to the defendants' exhibits cited in anticipation, the same rule may be applied. Such a matter is to be left to the artisan who uses the machine, and he will ascertain more of what the necessary speed should be in an hour's practical experimenting, as is common in all trades, than any theoretical expert can do in his office.

Such distinctions of the machine and speed of it are not matters of invention, but belong to the ordinary business of operating the machine.

Complainant has made a point upon the time and trouble spent by Potts (see his testimony, in arriving at the use of a smooth faced cylinder in combination with the cutting cylinder in the combination included in the Potts first and second claims, and desires that the difficulties through which said Potts passed shall be taken into account in determining whether the mechanism included in the said claims is a patentable invention.

To this I reply, that when Mr. Potts got up his first machine, using a concave abutment, it was true that concave abutments with a centrally projecting boss was a step in the wrong direction, and not being thoroughly acquainted with the art of grinding mills and roller mills, he took a long time to discover that a smooth-faced roll placed opposite his cutting cylinder would be one of the best kinds of abutments he

could use in such a combination. This does not at all prove the novelty of his invention.

Suppose Mr. A. interests himself by preparing a new-fangled knot in a string, and having found it rather impracticable, he attempts to find a better kind of knot for his specific purpose, and at last, after many experiments, he falls upon a very simple and useful form of knot, with which he ties a bundle of umbrellas. To his surprise, he is informed that he is not considered the first inventor of that knot, similar knots having been in use to tie other kinds of bundles, such as hairpins. He claims that the knot for tying hairpins would not be strong enough for use in tying his bundle of umbrellas. The deduction is obvious.

He was groping in the dark, when he might have been in the light by stepping into the next art room. In this connection, I refer your Honors to remarks of Judge Sage, respecting the case of *Butler et al.* vs. *Stockel*, 53 Official Gazette, 1090, Nov. 3, 1890.

The mere fact that a supposed inventor has spent much time and study over a mechanism which he finally uses in a shape satisfactory to himself, does not entitle him to the position of a first inventor. If, when he begins his experiments and study, he is ignorant of certain important well known previous advances in mechanism entering into the problems he has to work out, and after experiment and delay he finally reaches certain standpoints already attained by the world, through the persistent endeavor and toil of others before him, he is no doubt an original inventor, but not the first inventor; and this rule should be applied with much greater strictness against him where he seeks to exclusively appropriate from

the public those treasures of knowledge already confided to them, than as between himself and a rival inventor.

In closing, permit me to cite the following cases: *Peters* vs. *Hanson et al.* 129 U. S., 541, (U. S. Sup. Court Reps., Book 32, p. 742). In this suit, the complainant proved that he had conferred upon the public a great commercial advantage by supplying them with an adjustable dash, one which could be sold to the trade, and adapted to vehicles of various widths, without reorganizing the dash or refitting it. His invention consisted in making a footless dash, and providing the lower bar thereof near each end with a horizontal slot neatly covered by the leather, and having separable feet to be fastened to the forward end of the road vehicle, the dash being then bolted to these feet by bolts through their respective aforenamed slots in the dash, the foot coming opposite some portion of the adjacent slot. No doubt existed that the device was of great value and convenience, nor of its appreciation by the general public, as the fact that many thousands of such dashes had been sold and the steadily increasing demand for such dashes, showed. Nevertheless the Court held that a slot was a well-known mechanical means or expedient for accomplishing adjustment, and that there was no patentable invention in applying it to a dash-board, although it had never been so applied before, and although its application in a sense novel, greatly benefited the trade and the public.

(See also cases of *Peters* vs. *Active Manf. Co.*, 129 U. S., 530, also *Peters* vs. *Active Manf. Co.*, 130 U. S., 626.

Permit me also to cite *Aaron* vs. *Manhattan Ry. Co.*, U. S. Rep., 132, U. S. Rep., 84, or U. S. Sup. Court Reports, Book 33, page 273. That portion of the opinion from

which paragraphs 2 and 3 of the syllabus are taken reads as follows:

"The patentee is entitled to the merit of being the first to conceive of the convenience and utility of a gate opening and closing mechanism, which could be operated efficiently by an attendant in the new situation. His right to a pateut, however, must rest upon the novelty of the means he contrives to carry his idea into practical application. It rarely happens that old instrumentalities are so perfectly adapted for a use which they were not originally intended as not to require any alteration or modification. If these changes involve only the exercise of ordinary mechanical skill, they do not sanction the patent; and, in most of the adjudged cases where it has been held that the application of old devices to a new use was not patentable, there were changes of form, proportion or organization of this character which were necessary to accommodate them to the new occasion. The present case falls within this category."

The patent was held anticipated by analogous mechanisms in use for other purposes, although said mechanisms were not exactly similar to the devices of the patentee.

In the case of *De St. Germain* vs. *Brunswick*, 135 U. S. Rep., p. 227, this court adjudged the patent void, holding that competent knowledge and skill of an intelligent mechanic would have enabled him to construct the revolving billiard cue rack in question without calling the inventive faculty into play.

In *Deering* vs. *McCormick*, Vol. 52, page 1223, Official Gazette of the U. S. Patent Office, decision by U. S. Circuit Court, District of Minnesota, see Court's opinion on Webster patent, No. 251,147, on page 1228 of said Gazette, referred to in last paragraph of syllabus.

On question of Double Use, see *Olds* vs. *Brown*, 41 Fed. Rep., 698, in which see opinion as to Gardner patent, pages 703–4; *Stimpson* vs. *Woodman*, 10 Wall., 117; also *Brown* vs. *Piper*, 91 U. S., 37 (1875).

See also the well known case of *Eickering* vs. *McCullough*, 104 U. S., page 318; also, *Florsheim* vs. *Schilling*, 137 U. S., page 574, decided November 10, 1890, and the *County of Fon du Lac* vs. *May*, 137 U. S., page 714, decided December 15, 1890.

Reference is respectfully requested to the opinion of Judge Sage in the present case, and his citations of decisions by this Court.

Therefore, defendants respectfully ask that the decision of the Circuit Court be affirmed, and that this case be dismissed upon appeal.

Respectfully submitted,

WM. HUBBELL FISHER,
Counsel for Defendants.